

*annals for 1954*

NATIONAL

SOCIETY

FOR BUSINESS BUDGETING



**ANNALS**  
**OF THE**  
**National Society for Business Budgeting**  
**1953-1954**

Selections from the Proceedings of the National Conference,  
Hotel Penn-Sherwood, Philadelphia, Pennsylvania, May 20-21,  
1954 and from the Technical Notes for the Year 1953-1954

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# TABLE OF CONTENTS

Part	Page
I. THE NATURE AND PURPOSE OF BUDGETING	
1. Duties of the Budget Director	
a. In an Organization Just Starting a Budget Program—G. A. Blair .....	3
b. The Function of a Budget Director—A. E. Barry .....	4
c. The Function of the Budget Director—E. A. Vatter .....	6
2. The Budgeting Function	
a. The Budget—A Tool of Coordination and Control—Henry P. Dever .....	10
b. Budgets and the Certified Public Accountant—Walter R. Bunge (with a preface by A. H. Weiss) .....	11
c. Management Control Thru Budgets—R. Visscher Millar .....	14
d. What Management Expects from Budgeting—Nelson C. White .....	28
II. FORECASTING AND PLANNING—SOURCES, FACTORS AND RESEARCH METHODS	
1. The Business Outlook for 1954—Milwaukee Chapter .....	35
2. The Economy Ahead—An Econometric Approach—Jacob Baker .....	42
3. Operations Research as an Aid in Planning—Arthur Brown .....	46
III. BUDGETING FOR NON-PRODUCTION DEPARTMENTS	
1. Advertising	
a. How Much Should You Spend for Advertising—Joel Dean .....	53
2. Engineering and Research	
a. Budgeting for Engineering Costs—Clyde Seeley and Bob Sutton .....	61
b. Developing a Research Budget—H. H. Hopkins .....	63
IV. DECENTRALIZED MANAGEMENT—PLANNING AND PERFORMANCE ANALYSIS	
1. Planning—Return on Investment	
a. Projecting Future Capital Effects—Horace G. Hill Jr. ....	79
b. Long-Range Planning—Russel B. Read .....	81
2. Reporting and Performance Analysis	
a. A Method of Reporting Accounting Data for Purposes of Planning and Controlling Performance—Jim G. Ashburne .....	92
b. Measuring Executive Performance—Richard F. Neuschel .....	98

# NATIONAL SOCIETY FOR BUSINESS BUDGETING

## Organization

Incorporated in 1951 in the State of Illinois, by merger of the Budget Executives Forum, an eastern group, and the National Association of Budget Officials, an organization in the Middle West.

"... an organization in which business executives can increase their knowledge of budget policies and techniques by the exchange of ideas in direct discussion with one another and by hearing outstanding speakers on budget subjects."

## Objectives

The National Society for Business Budgeting is an educational, non-profit organization devoted to the following objectives:

1. Fostering a full and real understanding of the budgetary planning and control function as an aid to, and as a part of, effective management.
2. Assisting in developing the competence of all those interested in the application of the budget function in management.
3. To collect and develop information to improve procedures and to conduct research, without profit, in the field of budgetary planning and control.
4. To disseminate, without profit, information, publications and research reports in the field of budgetary planning and control to educational institutions, and such other institutions and organizations consistent with the purposes of the Society.

## Membership Eligibility

The organization is open to all business executives with an interest in budgetary control. Primarily the organization is for company budget officers or budget directors. Due to the fact that in many companies the budget activities are not centered in one particular person, it is intended that men who spend only a portion of their time in budget activities or who have considerable personal interest in budgeting, be accepted into membership. Members of the accounting and industrial engineering professions and other allied groups are welcomed. Annual National dues are \$10.00 for each membership, and local chapter dues are set to adequately cover chapter expenses, without profit.

## Value of NSBB to Your Company

A company with a member in NSBB can learn directly about experiences of other practicing budget officers, what their problems are and how such problems are solved. In many cases the per-

sonal contact develops and produces valuable information that would not be available to a practicing budget officer in any other way. The opportunity to learn from others is equally valuable to both large and small companies and to those who are planning to set up budget systems as well as those who have already developed their own.

## NSBB Chapters

Philadelphia	Chicago
New York	Minneapolis-St. Paul
Milwaukee	Indianapolis
Cleveland	Cincinnati

Additional chapters are in the process of formation.

## Publications

To assist in accomplishing the objectives of the organization, NSBB members produce several regular publications. A high standard of professional competence has been set and is being maintained in these endeavors. Much of the case history material so recorded is not found in any other media and, consequently, is much in demand by educational institutions, non-member companies, and the interested business public. These publications are furnished to all members and limited quantities are available to others upon request, free or at cost.

*NSBB Newsletter*—A monthly report of the various chapter events, news of individuals and related conferences, and all national activities.

*NSBB Technical Notes*—A technical publication issued monthly, in which case history material, chapter programs, papers by members, and selected additional material in the field of financial planning and budgetary control are presented.

*NSBB Annals*—An annual publication, containing most of the principal addresses heard at the NSBB national conference, usually held in May of each year. This publication, in book form, represents contemporary thought in the control field, case histories of budget systems installation, application and techniques, and financial forecasting data.

## Research

Each local chapter selects a research topic for a period of time usually determined by the complexity of the subject. Upon completion of the project in which members and member companies participate a report is presented to the entire NSBB membership.

Other chapter effort in research has been directed toward cooperation with colleges and universities. Considerable success has been

achieved through such joint cooperation with institutions of higher learning. Such activity furnishes universities with current material usually not obtainable in other ways and benefits NSBB members and member companies as a result of informed analyses disseminated throughout the entire organization.

#### **How to Become a Member**

To enhance the possibilities for exchange of ideas between members and to maintain a suitable climate within the local chapter for discussion participation by all, most of the chapters are limiting membership to 60 or 70 members. When a chapter exceeds this number the possibilities for

establishment of an additional chapter in the same city are explored. The By-Laws provide that a nucleus of seven qualified members is required for the establishment of a chapter.

If you are interested in becoming a member at large to obtain NSBB publications, or starting a chapter in your city, contact any of the officers or directors listed on preceding pages, preferably the Chairman of the Membership and Chapter Formation Committee. Your interest in becoming a member of NSBB is cordially invited.

**MR. E. G. MAUCK**  
Eli Lilly and Co.  
140 S. Alabama St.  
Indianapolis 6, Indiana



## PRESIDENTS' COMMENTS

### The Year 1953-1954

The National Officers of NSBB are indeed pleased at the progress achieved for the year 1953-1954. The addition of several new chapters has been effected and the potential development of many more is forecasted.

Perhaps even more significant is the fact that the professional prestige of the organization as well as close adherence to the valued objectives of the society has been not only maintained but enhanced over past months.

A further awakening of the science of budgetary control and planning is evident in the economic sphere of our great country. All of us who are members of the Society should accept as a challenge continuing personal development in the field and the fulfillment of stated NSBB objectives.

It is a pleasure to report to you, the membership, and to the interested business public, that your Society has achieved new dimensions as an aid to the development of the economic life of the national business community.

I personally wish to express my appreciation to all other national and local officers and members for the wonderful spirit of cooperation, diligence, and excellent performance of duties during the year.

CLL-sh

C. L. LINEBERGER  
*President 1953-1954*

### The Year 1954-1955

The National Society for Business Budgeting is starting the year 1954-1955 with plans to fulfill to the fullest extent the stated objectives of the Society and thus serve its members and the nation's business community most effectively in the field of business planning.

The Society is young (incorporated in 1951) and while it has had a rapid growth, it has been zealous to maintain a membership of high calibre executives interested in the planning of operations for maximum profit. It shall continue this policy of selectivity in its membership.

Plans for the coming year are principally in the following areas:

1. The organizational structure of the Society has been revised in order that the work of administration may be spread between more individuals and thus enable the enlarged membership of the Society to receive maximum benefits.
2. The technical aspects of the Society are being fortified in order to expand research activities and to disseminate through the Society's publications those techniques that represent modern management's most recent thinking.
3. The program of NSBB in the interest of expansion has been broadened in scope by establishing regional committees for new chapter formation in the East, Mid-West, South and Pacific Coast States. The purpose of this endeavor is to organize chapters in cities where they do not presently exist and thus make available, to business executives interested in the field of budgetary planning and control, the advantages of chapter membership.

Recognizing that the prestige of NSBB is directly related to its technical contributions in the field of planning and control, the new Officers and Directors aim to maintain the high standards of proficiency which were established by the founders of the Society.

H. P. KELLEY  
*President 1954-1955*



## EDITOR'S PREFACE

As indicated a year ago, the purpose of these Annals is to present a cross-section of the Society's work for the year. By selecting representative material from the National Conference and from the monthly "Technical Notes," it is hoped to demonstrate both the continuity of theme and the cumulative value of the Society's various presentations.

The first section of the 1954 Annals relates to the broad, general functions of budgeting, stressing such fundamental notions as planning and control. The second section deals separately with the subject of forecasting or planning; the third and fourth sections deal with both planning and control as applied respectively to non-production departments (III), such as sales or engineering, and to the major divisions (IV) of a decentralized multi-plant or multi-product company.

From the second section through the fourth the reader progresses gradually from short-run to longer-run considerations; the third section is intermediate in this respect, since advertising and research are recognized as having both short-run and long-run aspects. From the first article in the book to the final one, the budget director goes through another and unintended type of progress. He starts out (in the first article) just trying to get by with a new system; in the final article (Measuring Executive Performance) he has become sufficiently well established to pass judgment on his peers and superiors.

A comparison of Richard Neuschel's final article on executive performance with Joel Dean's earlier material on advertising expenditures brings to light an interesting and significant type of conflict in the philosophy of budgetary control. The two writers take somewhat different views of the relative merits of "profitability" and the "objective-or-goal" types of performance standards. A similar issue is suggested by the earlier articles relating to econometrics and operations research, which, like Dean's "profitometrics" emphasize the mathematical and the measurable as opposed to the intangible. The position of the Neuschel article is not intended to imply that it contains the last word on this issue. The fact simply is that a book such as this must necessarily come to an end even though it cannot always come to a conclusion.

W. D. KNIGHT  
*University of Wisconsin*  
September 1, 1954

## **PART I**

### **THE NATURE AND PURPOSE OF BUDGETING**

- 1. Duties of the Budget Director**
- 2. The Budgeting Function**



# 1. DUTIES OF THE BUDGET DIRECTOR

## AN ORGANIZATION JUST STARTING A BUDGET PROGRAM

By G. A. BLAIR\*

Just as the duties of a Budget Director will vary in different firms, so will his duties within any one company vary as the budget program progresses through various stages. I would like to present some thoughts on the duties of a Budget Director in an organization just starting a budget program, which may be somewhat different than his ultimate duties once the program has been in operation for a period of time.

The most important task of the budget man who has been given the responsibility of installing budgeting is obviously one involving "education." How successful he is in this phase will reflect directly in the effectiveness of the entire program, for we all know that successful budgeting is primarily an "of the people-by the people" proposition. Although one of the prime requisites of a good budget program is that it have the blessing of top management, any attempt to convert this "blessing" to a strong arm of authority will obtain results which are anything but lasting. It is one thing to receive cooperation because the other party wants your help, but quite another if he believes he is being forced.

### The "Bottoms-Up" Approach

For this reason, then, it would seem that it is the duty of the budget man to deal with the subject in his own right, and not in the name of management. This makes it a "bottoms-up" problem, and the duty must be discharged in favor of the lower levels; top management is the beneficiary, not the executor.

Under such circumstances, the Budget Director's responsibilities would be along these lines:

1. To become thoroughly acquainted with the line of organization for the firm, including the possibility of indirect connections not shown on the organization chart.
2. Learn something about the background and experience of everyone with whom he will be dealing, on the subject of budgeting; find out what they may already know, or think they know, about budgeting.
3. Analyze the problems that each division has had in recent years. By studying statements, expense records, etc., look for situations where a budgeting approach would have been of benefit to the division head.

4. Be prepared to discuss your subject in the language of your listener; it is your duty to him to learn his terms, not his duty to learn yours.
5. Make a few mistakes. Nothing will endear you to your fellow man more than demonstrating you, too, are human. You should, of course, carefully select a field where there is a safe margin for error, and your demonstration should be for the purpose of illustrating that budgeting is not an exact science which must always be completely correct, but rather a scientific method of ending up almost but not necessarily right. Discreet use of words such as "goal," "objective" or "plan" in place of "budget" can do a lot to unfreeze an otherwise unreceptive foreman.

What is obviously one of the most exacting duties of the budget man just starting a program, however, is the task of engineering the change-over from existing methods to an integrated company-wide budget. Rarely will any company taking this step be in the position of having had no plan at all—invariably each division will have evolved its own particular brand of budgeting, and will likely be unwilling to readily acknowledge that you have a better one. The eventual success of the entire program may hinge upon your ability to accomplish, here, willing acceptance of what you are presenting as an improvement of each individual's plan, rather than a completely different system.

To deal in the other fellow's terms means you must learn all you can about his system—who designed it, how it works, what it accomplishes, and so forth. Remember, you are probably going to render somebody's brainchild obsolete, and he is going to compare every single facet of your program with his. This comparison will continue for months, long after you may believe your new program has caused everyone to forget there ever was any other budgeting method. Small wonder that a thorough knowledge of what has gone before becomes an important duty of the budget director—he will be dealing with it for a long, long time.

By dealing with the operating levels on their own terms in the period of installing budgets, the budget man is building a foundation for a strong and effective budget program. He could most assuredly complete this first phase much more rapidly by walking out of the president's office each day with a fresh batch of instructions—ulti-

\* Presented at the National Conference, Hotel Penn-Sherwood, Philadelphia, Pennsylvania, May 20-21, 1954. Mr. Blair is Assistant to the Controller in Charge of Budgeting, Andrew Jergens Company.



matums to division heads to "cooperate with this man in putting budgets to work." By starting where the plan is to work, however, he does not need any ultimatums; his own knowledge of what is to be accomplished, and the ability to approach the goal from the other's viewpoint, will attain a more solid and more lasting understanding. A trip to the top man's office should be for the purpose of reporting results, not to request help. The quickest road to results is by way of the operating levels who will be using budgets. Why not, then, concentrate all efforts there?

### Educational Duties

The budget director must expect to be asked for a lot of help, especially at first, and he should be prepared to give it. In so doing he may appear to be drifting away from strictly budget duties—until one remembers that very few activities in any part of the business are not connected in some way with budgeting. So here is the field where, in an organization just starting a budget program, the budget director is likely to find need for the greatest concentration of effort—it is here, in other words, where most of his duties fall. Among the "educational duties" are such as these:

1. Doing most of the budgeting, as a starter, for every division—just to show that it can be done;
2. Patiently showing the head of each division, at the conclusion of each budgeting period, where variations occurred, and the significance of the differences;
3. Preparing preliminary comparative data, to enable the department head to make his own budgets—with considerable help from you, of course;
4. Talking about budgets in understandable terms—establish a reputation for yourself as the man who "knows what we are both talking about."
5. Preparing frequent progress reports, analyzing (in your reader's language) the

status of the budget to date; show how such comparative reports can help the division head to know not only where he now stands, but also "where he is going."

6. Being prepared to answer questions. Take a look at all reports through the eyes of the department head, and anticipate likely questions. By getting the answers so they are at your finger tips when questions are asked, you take some of the mystery out of the subject and encourage fuller understanding. The less you have to say "I'll look it up and call you back" the better.
7. Designing all phases of the budget program to fit the needs of the parties involved. Here again I refer to "using your listener's language." The forms and reports must be designed to be useful tools, and to be useful they must be understood. One of your duties is to learn the most effective means of dealing with the other parties; build your program up on that basis. For example, reports to the production man may be in terms of units of production or hours of direct labor with which he is familiar, rather than dollars of sales or per cent of profit.

Any of you who have experienced a budget installation can, no doubt, add plenty of other duties to be fulfilled in getting the system underway. Many of these are strictly one-time duties, while others may occur for the first year or so. I have endeavored to enumerate primarily those duties associated with first-year problems, avoiding duties which are generally associated with the budget director's responsibility in all phases of a budget program.

As mentioned in my opening remarks, it is my belief that the budget man has a positive duty to the operating levels, at this stage; properly carried out, success in this area will almost itself take care of the duty the budget man has in the other direction, to top management.

## THE FUNCTION OF A BUDGET DIRECTOR

By A. E. BARRY\*

My comments will be confined to my functions as Budget Director installing and operating the initial budgetary control system in Manning, Maxwell and Moore. The corporate structure of this organization includes two divisions—one manufacturing load lifting equipment, and the other manufacturing steam specialties, such as gauges, valves and instruments. The Load Lifting Equipment division has one plant, whereas the Steam Specialties division operates seven plants.

\* Presented at the National Conference, Hotel Penn-Sherwood, Philadelphia, Pennsylvania, May 20-21, 1954. Mr. Barry is Manager of Business Service, Manning, Maxwell & Moore, Stamford, Connecticut.

### Installation

My first approach was the development and presentation of a budget plan. This plan provided for installation of annual fixed budgets in all departments of each plant. Each plant was to be provided with a self-contained budget program. The first introduction was in the Sales department, then in Manufacturing and Engineering, and finally into the administrative departments. After completion of installation in all plants, we consolidated the budgets into a corporate budget.

In the Sales department we developed, installed and operated a monthly order volume budget and



a monthly budget for sales expense and capital appropriations. These budgets were planned for one year in advance.

When the Sales department had assimilated the program, we moved into the Manufacturing department. In this department, we installed budgets for control of volume of monthly shipments by product line, direct labor, expense, manufacturing profit, inventory requirements and one year of capital expenditures.

Immediately following this installation, we worked with the Engineering department and established an annual capital expenditure budget for drawings, tools and patterns, and a monthly expense budget for the ensuing twelve months.

The installation work in these departments consumed one year's time, during which we conducted a monthly follow up and review. These reviews indicated needed adjustments in our procedure and methods.

It was necessary to develop a co-ordinating procedure for Sales and Production to permit adjustment necessitated by variance of actual orders received compared to budget. As a means of accomplishing this co-ordination, the divisional general manager holds monthly meetings of sales management personnel with production management personnel. At these meetings, the sales management presents the pattern of actual orders received for the current month and projects their present outlook for the ensuing three months, providing explanation of any variance from budget. The production management adjust their production program to conform to the current projection of the sales order pattern. They also explain variances from the production budget necessitated by current operating conditions.

These meetings have been held without interruption since their inception. Beyond the benefits derived from a budgetary viewpoint, these meetings have provided the Sales and Manufacturing departments the opportunity to discuss and clarify their mutual problems such as:

- Standardization of product
- Lead time improvement
- Inventory reduction
- Cost reduction
- Procedure
- Product quality

When we compiled the second annual budget, we included administrative departments' expense and capital budgets.

During the third year, the budgets were incorporated in our monthly Profit and Loss statement to reflect variances from budget. This arrangement eliminated the excessive follow up and separate reporting of performance versus budget statistics to management.

### Administration

As we completed installation in all departments at all locations, the duties and responsibilities of the Director of the Budget were more of an administrative nature.

They were:

1. Responsibility for administration of budgeting policy and procedure.
2. Preparation and issuance of budget procedures and practice instructions.
3. Co-ordination of all departmental budget activities.
4. Presentation to management of periodic reviews of actual operations in relation to the budget.
5. Suggestion of revisions of the budget to management when conditions warranted a revision.

In performing these functions, I direct a budget organization consisting of an appointed supervisor in each plant, sales, or engineering location. He is responsible for directing the budget functions in his location. Dependent upon the volume of budget activity in the department, the manager assigns a full or part time budgetary man with the responsibility for the maintenance and operation of the budget work.

In administering the responsibilities of the position of Director of Budget, our plan requires the issuance of a reporting schedule for the compilation of the annual budget six months in advance of the beginning of budget year.

The schedule is issued to Engineering, Sales, Manufacturing and Administrative departments for each division of the business. The data received are compiled by the Budget Director into a total corporate budget plan which consists of a Profit and Loss, Inventory, Capital Expenditures statement for each plant, division, and the corporation. We also present an annual Source and Application of Funds statement for the corporation.

These budget statements are presented for review by the President, General Managers, Controller and Treasurer of the corporation. The adjustments required are made and a final draft of the total corporate budget is submitted to the president for his approval and submission to the Board of Directors for acceptance.

After acceptance by the Board of Directors, we compile the budget folders for distribution. These folders contain the budgets for each plant, division, and the total corporation.

It is the responsibility of the Budget Director to review both monthly and quarterly the variances of budgets and actual performance, and to direct the investigation of the major variances. The reviews and reports are made by the budget employee responsible for the area under review.

The monthly or quarterly review requirement is dependent upon the functions in a department. For example, in the Engineering department a monthly review would be made to compare actual expense accounts with budget, whereas for this department, a quarterly review would be made to compare the actual volume of capital appropri-

ated, committed and expended with the budget. This review includes a report on the status of projects completed and the adjustment of project time tables. Copies of all review reports are distributed to the Director of Engineering and the Director of Budget.

There are numerous monthly reviews made in the manufacturing departments. They are necessitated by variations disclosed by:

1. A comparison of actual shipment volume by product class with budget;
2. A comparison of actual profit by product class with the budget;
3. A comparison of actual expense by accounts with the budget;
4. A comparison of actual inventory with budget;
5. Also by various other reports which are established on a program basis for presentation to the Works Manager and the Director of Budget.

Similar monthly reviews are made of Sales and Administrative activities.

With respect to the Source and Application of Funds budget, it is supplemented by a current cash prediction compiled monthly for the ensuing three months. A detailed examination is made for major variances. This report is distributed to the President, Treasurer, Controller and Director of Budget.

Monthly, the budget director prepares a highlight report of actual operations results shown in the Profit and Loss statement versus budget for the previous month, and forecasts the trend of

actual operations for the ensuing quarter. This forecast is distributed to the President, and officers reporting to the President.

Annually, a review is made by the Director of Budgets wherein he compares the total corporation expense by accounts for past year with the previous year. He determines the reasons for variations and recommends corrective action.

He compiles a report showing a comparison of the number of people employed by each department in the past year versus the previous year, determining the personnel increase or decrease and the reason.

There are two corporate review meetings held within the budget year. Each July the Director of Budget reports on actual performance for the first six months of the year versus the budget. In a second meeting in December, he reports on the year's performance and the establishment and introduction of the new budget for the next year.

These functions which I have outlined to you apply equally to a single plant or a multi-plant organization.

As you have learned by now, our budget plan is designed specifically to make the men responsible for the actual performance of operations also responsible for compilation and administration of the budgets in their departments.

A plan of this type requires the continuous belief of management in the use of budget planning as a major tool for successful operations.

After seven years, as Churchill said, of blood, sweat and tears in operation with this plan, we know the necessity of perpetually selling it, as Roosevelt said again, again and again, to every strata of management.

## THE FUNCTION OF THE BUDGET DIRECTOR

By E. A. VATTER\*

"I wonder what became of the old-fashioned man who used to wear a boiled shirt with a collar button and no necktie." That is a line I saw in a business magazine. Those words have formed a picture which seems to stick in my mind—the old-fashioned man who used to wear a boiled shirt with a collar button and no necktie. It really hasn't a thing to do with our subject but as I think of the progress in business, especially business budgeting, it becomes a remarkable thought. You would not expect to walk from your office to the street and behold that old-fashioned man—nor would you expect today's progressive budget director to stand still once he had a budget system

running smoothly. You would expect him to explore new fields relative to budgeting control. That is what I will try to cover—new or peculiar functions.

Our subject for this panel discussion is "The Function of the Budget Director." It was expected that the philosophies of the three of us on this panel would be somewhat different. The program has not been rehearsed, the fact that we are different in our addresses is the result of our attempt to bring out peculiarities and not standards in budget directing. Certain standard functions, however, need to be touched upon.

Let me say at this point that I dislike using the phrase "Duties of a Budget Director." We may analyze the word duty, as conduct; obedience; requirement or moral obligation. Each one of those words is contained in Webster's definition of

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the word duty. What budget director wants to feel that he is required or morally obligated to carry out his job in a prescribed manner. Better that he be a pioneer or explorer without a duty but with a will to perform. His is the type that extends to new fields of control and establishes new values in budgetary control.

Before discussing the functions of a budget director, one thing should be clear. Probably there is no management activity which reveals weakness in organizations as readily as a good budget system. Because of this, if for no other reason, the budget director should be a person with qualifications, understanding and ability to see through the eyes of management as well as the eyes of the supervisory factory employe. He must be able to intelligently discuss and explain both positions. Without this liaison, much of the human behavior in budgetary control is lost and the budget becomes an empty and fruitless formality.

### Standard Functions

Let us take a look at some of the specific duties of the budget director in the order in which they might occur. In setting the budget for each department, the budget director should go to that departmental head and sit down with him in his own world and environment to receive and discuss his own estimate. Naturally, it is assumed that the budget director has spent considerable time in studying the operations of that department so that he may talk intelligently with the department head. I believe the first and most important step is to let that estimate be made by the departmental head. Items of a questionable nature should be thoroughly discussed at this time "seeing through factory eyes" and arriving at a reasonable estimate that will be explainable when reviewed by management.

In the case of a business having a budget committee which reviews the preliminary estimates, it would be logical for the budget director to have all the information available which was used in arriving at the departmental estimates. He should direct the collection of such information and the preparation of reports and charts which might be useful to the budget committee and the departmental heads.

After complete review and approval has been made by the budget committee, the budget director should return to the department heads and explain any revisions and explain to the satisfaction of each department head affected. It is here that the budget director's finesse and reasoning powers are put to test to assure that there is no feeling by the department head of having been pressured into accepting a revision of his original estimate. It is expected that no revision will be made without reason and facts to warrant, but it is the budget director who must be able to convince the department head that each revision is proper and acceptable.

At this stage it would seem that final acceptance and approval would be sought by the budget

director from top management. A budget system without the prod of the chief executive would be like a ship without a master. Here the budget director puts his management side to work. He is like a split personality, only both sides must be good and understanding. His budget estimate should be so fully a part of him at this point that he can walk into the chief executive's office prepared to explain the departmental head's estimate and to account for any items which may appear questionable to the executive. It is here that he "sees through the eyes of management." An estimated balance sheet and statement of profit and loss will give management a complete picture of the contemplated program and its effect on the financial and earnings picture of the company. The approval by the chief executive is in effect his acknowledgment of your having studied the position of the company and its possibilities for the future.

Having progressed to approval and acceptance of the estimated budget, it can now be put into effect through periodic reports prepared by the operating departments, or the accounting department as is more often the case. Here again the budget director finds his position between the department heads and the budget committee an all-important factor. His study of actual and estimated performance should justify his making recommendations with reference to revisions. His recommendations, if approved by the budget committee, should be transmitted by him to the department heads.

I believe that the budget director should prepare a manual of standard instructions to cover the fully developed budget procedure. This maintains a uniformity to budget practice and enforcement. Naturally, the main purpose of the manual is to establish responsibilities, authority, and the steps taken in preparing an estimate, standardized as much as possible.

### Peculiar Functions

I've tried to catalog my thoughts so far, in line with steps taken to set up the estimated budget and the preparation of periodic reports as affecting the routine functions of the budget director. Now let's get away from the everyday functions and touch on a few of the peculiar ones.

Budgetary control can be successful only through the cooperative effort of all concerned. The budget director must be the key figure in directing factory and management attention to constant comparison of actual and planned results. This in effect is the very essence of successful control. In directing attention to improper processing which has caused unhealthy variations in the periodic reports, the budget director should have sufficient authority to bring about the correction of those conditions. He should maintain a constant vigil, in the detection, investigation and ultimate correction of bad practices, making visits to factory areas as required for full and complete knowledge in this respect.

Another thing, which I have had occasion to witness and I believe to be rather an important factor, is the designing or format for periodic budget reports. The departmental head is basically a production man and has not had the technical education in accounting and its many forms. It is quite possible to present him with a periodic budget report that will tax his powers of understanding or comprehension. The budget director with his close relationship and understanding of factory and management thinking should have much to say about the design and use of budget reports. The simplification of design and streamlining of data accumulation is a most fertile field for development that can fall within the scope of the budget director. The budget is a wonderful and useful tool to management. The design of that tool and its full effect can be reached only through the use made of it and the ability of those using it.

We are currently in the process of studying an hourly budget as opposed to the ordinary dollar budget now in use at our plant. Our budget director is conducting the full study and is actually maintaining an experimental hourly budget summary each week for the third quarter. When experiments are complete and we have enough data to present a case study, we will present it with pros and cons for adoption. Many of you are probably already using an hourly budget. Those of you who are not . . . think for a moment of some of the advantages of an hourly budget. The hour is certainly more stable than the dollar. It, therefore, provides a direct performance comparison between similar operations regardless of country or currency. A year to year comparison of the same operation can be made without effect of economic trends. An hourly budget will expose where temporarily excess man hours are actually being used.

Here then is a branch function which I believe should be pioneered by the budget director. The opening of new fields so that management can observe an even more unique budgetary control and make new and better decisions.

We can find a direct relationship between degree of efficiency within a department or business and the variances revealed by budgetary control. The periodic budget summary provided a department or the consolidated summary for a complete operation or business does reveal how well the operation is doing as related to a basic budget estimate. It does not make known the efficiency for that operation or department. A department sporting a high efficiency rating should as a general rule run close to its budget estimate. Maintaining a good level of efficiency, at the same time indicating consistent savings on budget summaries, would indicate "cushioning" in the basic budget estimate. The budget director then has reason to review the budget estimate for that department or operation. When the budget savings and the efficiency rating increase together, then it is a sign that the budget is being put to good use and reflecting in the efficiency of that operation.

How many large manufacturing firms have a scientific method of measuring indirect materials for budget estimates? I do not mean taking past records or looking out the window for a convenient box car going by and jotting down the car number for an estimate. Too many such figures are set just so easily. Not all types of business are concerned with such detail of indirect materials but a manufacturing firm, such as International Harvester, Louisville Works, has much to be concerned about. In our business, Indirect Materials represent over 10% (2½ million) of the total overhead expenditure and it's all controllable. Here again is an excellent field of study which will keep the budget director on his toes if he's progressive. I won't go into detail but it simmers down to this. The study is based on the use of indirect materials such as machine repairs, tool repairs, jigs and fixtures, cutting tools, abrasives, etc., based on their actual relationship to the production schedule and usage of the machine in producing parts for that schedule. It's a tremendous study but one which I believe should be activated by the budget director.

The NSBB Technical Notes for March carried the paper prepared by Roy Brittain, past president of the Cleveland Chapter and titled "Sales Forecasting and Marketing Cost Control." Coincidental to this, our April meeting in Louisville covered "Production Forecasting." The point that I intend to bring out is the important function of the budgeteer in assisting production personnel in the forecast. Throughout Mr. Brittain's article the direct relationship is evident. In our program address in Louisville by Charley Manteuffel of Jefferson Island Salt Company, our next Chapter Secretary, an even more direct function of the budget director was stated. Briefly, it is this.

Forecasts are prepared through accumulation of data from many regions, districts and managers. When all these data are correlated, there is a strong possibility of overestimates or underestimates. This can be so, due to an overzealous sales representative who in his own sight is a pretty good salesman and has all good intentions of knocking the lid off every sales record ever made. It can also reflect an understatement made by the fellow who likes to set aside a little cushion so that he might look good as his sales are compared to the estimate during the year. In the case which I am citing, the budget director has a widespread knowledge of the activity or efficiency of the entire sales organization. Forecasts submitted can be tempered by his knowing this person is inclined to overstate or the other representative customarily holds back a little. This tempering in addition to his having past records for comparison go hand in hand towards better and more accurate forecasts. So, I boil it down into a few words by saying, "The budget director is functioning in high gear when he can forecast the efficiency of the forecasters."

Let me ask this question. "What Are We Not Doing That We Should Be Doing?" Have we as

budget directors been so deeply concerned with the Sales Budget, Distribution Cost Budget, Production and Operating Cost Budgets, Plant and Equipment Budget, Merchandising Budgets and Expense Budgets . . . that we may have overlooked—let us say—the inventories. Here is a budget of such importance that it ranks with the sales or financial budget. Too high an inventory means cash tied up, possible losses, even reason for liquidations and receiverships. Too low an inventory on the other hand results in possible loss of business due to delayed deliveries, ill-will and decreased profits. Good inventory control, in a

word, requires wide awake, progressive management, and modern methods of budgetary control.

Are you so interested in the usual routine matters that have been going on year after year, that you are failing to recognize something else on which you should be setting controls? In other words, do you miss that old-fashioned man in the boiled shirt . . . collar button . . . no tie . . . or have you been so busy being progressive, that there is no room for old-fashioned ways. If so, then you have found that there is no end—absolutely no end—to the functions of a budget director.



## 2. THE BUDGETING FUNCTION

### THE BUDGET—A TOOL OF COORDINATION AND CONTROL

By HENRY P. DEVER\*

To most people the very word budget has a nasty connotation. Many people think of a budget as an invisible but invincible prison. It implies walls of neatly arranged mathematical figures which confine those who must live within the budget just as effectively as though made of concrete and steel. When properly developed and applied, however, a budget not only becomes a useful management control tool, but also a humanizing influence in business.

If your budget is to serve as a control, it should be set up so that it follows responsibility and authority as delegated. Very close correlation of the organization chart and the budget is therefore essential. It is almost axiomatic that when such delegation occurs, partial control over and responsibility for some segments of the company's income and expenditures goes with it. If the budget sets out its figures in the same groupings that occur in the organization, the element of control is simple and ready at hand; if it cuts across group, department, or divisional lines so that figures include, say, people from more than one responsibility or functional group, the ability to hold a single person in each organizational group accountable for actual results is compromised. The effective use of the budget as a management tool, then, is related to the manner in which it is planned and set up.

At our plant the comptroller and his accountants go to each division group head and, sitting around the table, discuss with him the coming period. That is using the budget as a management tool even before it is a whole-cloth document and an approved yardstick for future performance. Several significant things occur in this initial process. The first is that each division head has put his own mind to work examining his present situation and the future. You will have no trouble in recognizing the coordination and the understanding thus gained at lower echelons of management, and the feeling of belonging to the management team that can and does come from such a simple process. The second point is the fact that, having participated intimately in the development of his own budget, the group or division head is committed in advance to meeting or beating it. He does not resist it as a superimposed control. Equally important, every level of management is made aware of the company's over-all goals, and

knowing them, can promote coordination in inter-departmental relations that more completely insures reaching these goals.

If you haven't started a budget system in your organization, you will suffer a lot of headaches when you do. Naturally, you won't get a perfect budget the first time. Start simply—make the budget an understandable and usable tool. Remember, a budget that can't be understood at all management levels won't serve its purposes. It follows that the various levels of management must be accorded the necessary education on their aspects of the budget and the plans in back of broad company policy.

It is our practice to revise our forecasts and budgets each quarter. Every month, however, we measure our relationship of actual to forecast or budget. Each group or division head knows shortly after the close of the month how his group came out in relation to budget. If his expenses show an upward trend, he must consider whether this was the result of some temporary condition or whether corrective action is required. If the latter, he takes it.

If one or more accounts show consistent ability to get along with less money than was budgeted, the next revision of the budget will remove the excess. On the other hand, if a division head runs over his budget and after proper study concludes that realistic expenditures are going to continue above budget, the next quarterly revision will provide a higher base. It is not practical to set limits that short-change real needs of expenditure. If on scrutiny it develops that a man should be given a budget increase, we believe in scratching around to find the necessary money for him.

Out of the studies of our budget we develop profit and loss forecasts. They are the real end-point of both sales forecasts, which establish estimated income, and budgets, which establish estimated outgo. The proposed income and expenditure tables, when finally put together by our comptroller, make up a budget, but not necessarily *the* budget. These figures come to the president's desk for final scrutiny, at which time profit and loss is also submitted.

It is at this stage of the game that the old crystal ball must be in first-class working order, for your budget and sales forecast not only can point the road you are following, but can spotlight the turns and rough spots and give you an opportunity to plan ahead to avoid them. Or you

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can do a little trouble-chasing before anything serious has had much time to develop. Such reports also point up those operations which are running along as scheduled, thus saving a lot of worry and needless effort.

In many of the accounts which you will wish to budget and control, there may be merit in comparing the figures, both budget and actual, to some base to which they should relate. As examples, we would compare to standard labor the factory supervision accounts—stores and stock handling, tool and die maintenance, production control, shipping and receiving, industrial engineering, set-up labor, salvage and re-run labor, etc.

In the case of other accounts, we think that comparisons to sales data are more significant. As sales data we include billings. The kind of budget accounts which we compare to a base of billings are such figures as all sales accounts, research and development engineering, patents, order and billing accounts, telephone, telegraph, accounting and payroll costs, etc.

In all comparisons, the base to be selected for comparison is the one against which a comparison will be most likely to be significant. Using such comparisons or ratios in percentages has the value of showing readily whether fluctuations which will occur in dollar figures are justified in the fluctuations of the base as over-all volume of sales and production goes up and down. As the budget becomes older in point of use, the historical background of these ratios and percentages becomes a valuable hindsight that assists the current budgeting processes and the control function for which it was established.

A budget is a valuable modern tool of management, but the details should be worked out in relation to a specific company, and to the extent that it can and will be used in that company. I feel sure that those who have set up a budget with the thought of using it as a means of control and coordination, and who have worked their plan as they planned their work, will agree that it is an indispensable management tool.

## BUDGETS AND THE CERTIFIED PUBLIC ACCOUNTANT

By WALTER R. BUNGE, C.P.A. with a preface by A. H. WEISS\*

### Preface

Some of us, perhaps, have wondered why members of the National Society for Business Budgeting seem to take a more active personal interest in the affairs of its organization than do the average members of other accounting organizations.

One reason, I am sure, is the stimulating association with other members who see the much more important aspects of the application of accounting skills and techniques than the recording and summarizing of business facts.

The late Justice Holmes said "The significance of facts is more important than the facts themselves, and if we know the significance we may even forget the facts."

Modern budgeting is of little value unless the true significance of what we are doing is intelligently interpreted and made available for management use.

Yet many accountants, controllers, or chief accounting officers (and even some budget officers) in some of our business enterprises are concerned more with the instruments of accounting than with its objectives, being too often tinkers

of records instead of professional men concerned with the attainment of management goals.

Accounting fails to adequately serve management when it continues to concentrate its energies on recording, classifying, and summarizing business data (the historical aspect) to the exclusion of the more significant activity of interpreting the results (the service function). This fact was given prominence in 1941 when the American Institute of Accountants amended its definition of accounting to include the phrase "and interpreting the results thereof."

It is even more important today than it was formerly to correctly determine the results that may be expected from a course of action or inaction. Before the New Deal worries of business were mainly concerned with competition and the weather. Today, these factors are of lesser importance. All business now both large and small is concerned with a multiplicity of rules, regulations, restrictions, inhibitions, arbitrations, priorities, licenses, decisions, hearings, indictments, controls, de-controls, stabilizations, etc. Then there are tax problems, local, state and federal, and on top of all that, the continued invasion of Government into competition with business on a scale broader than ever before.

Following is an article entitled "Budgets and the Certified Public Accountant" which should be of special interest to those in public accounting practice. It suggests that the Public Accountant

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has a great opportunity, if not a duty, to furnish competent consulting service in budgeting to his clients. It is my opinion, such service will be rendered to business and it is hoped that such service will be in the hands of individuals or groups with the integrity, training, and discipline usually associated with those in practice as Certified Public Accountants.

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Budgeting is no less applicable and important to the small business than it is to the large one. The budget of a large business is simply the composite of multiple budgetary units of small sections of that business.

Whether it knows it or not, every business management actually performs some of the functions of budgeting. It must plan ahead, it must coordinate its activities, and it must use principles of budgeting in pricing, even though these functions are performed informally and no actual written budget exists. In such cases the accounting system sometimes lacks that applicability to the problems of management which a good budget induces.

### **Accounting Adapted to Management**

Budgeting links accounting and management. It links past experience with plans for the future. Since one of the chief objectives of accounting should be to contribute to management, the adaptability of an accounting system to budgetary control along management lines is an excellent measure of the effectiveness of the accounting system. The installation of a budget sometimes points out the need for revisions in the accounting system which make that system more adaptable to the needs of management.

The ordinary accounting system stops short of certain administrative requirements. Something more is needed for management. Cost Accounts are designed to determine the cost of a product or a unit of the product. They are useful in the determination of Cost of Sales, of Inventory, and for pricing. They show cost variances, but they are in terms of components of the product. There are many areas in which they do not point out to management specifically the departments or the individuals who are responsible for the variance in costs.

General Accounts are necessary for statement purposes, for the S.E.C., annual reports, and a number of other things. But neither do they point an accusing or an approving finger at just that area which needs attention or which is deserving of commendation, nor do they indicate if an approved plan is safely being followed.

The budget, on the other hand, is designed to give to management the essential information to control the men and the activities of an organization. It is functional and administrative in viewpoint. Management appoints people to whom it delegates areas of responsibility. These people in turn appoint others to whom they delegate parts

of their responsibility. A good budget follows this line of organization, forcing the responsible persons to plan ahead, to coordinate these plans, to have them approved, and then to live with them; and yet it gives them flexibility in operation. In this way it follows exactly the organizational line of authority in following authority with accountability. It links accounting to management in the language of management.

Businessmen, and those who influence the thinking of business, and those who reflect the thinking of business through writing and talks are coming to feel that accountants have of necessity to work more for the government and its agencies than for their own businesses. They feel that the accountants ought to fill the gap of information which management lacks but needs to run its business, but they are afraid the accountants are too pre-occupied with other things.

Your clients may now be using budgets. If they are, are those budgets really effective or could you improve them? If your clients are not budgeting, you may be sure that many of your clients' competitors do budget. Why not give your client the same advantage? If you do not enter into the field of budgeting, and encourage your clients to do so, someone else will. It is quite possible that that someone else may be of a non-professional character. Consultants who begin working with shop layouts, often wind up with changing the accounting system, and the next step is the budget. Why don't you start at the budget and the accounting system—with which you are eminently familiar? You know the client, you know his accounting system, and you know good accounting. You are the logical professional group to install budgetary control.

### **What a Budget Is**

Perhaps we should define a budget. It is really nothing more than a written and approved plan of operations and the effects of those operations expressed in terms of dollars. The structure of the budget follows primarily the organization plan of the company and secondarily the Chart of Accounts. It indicates what everyone will do under a given and variable set of conditions and what the composite effect of all those activities will be.

How complicated is a budget? Just as complicated as the business which it reflects. It is the plan of operations of that business and is just as simple or complex as is the business. But if it is therefore complex, it is a complexity with which you are already familiar.

In order to establish a budget for the coming year, it is necessary to determine the approximate range of volume within which the company will operate during that year. Because of the importance of this factor, the first consideration in establishing a budget is usually the anticipated level of sales. When this has been established, the more detailed plans of the manner in which the company will spend its money are developed.



Every level of management from the president down to the foreman participates; everyone who spends the company's money is required, under appropriate guidance, to estimate what he will do for the coming year at the anticipated level of operations. He does this for every applicable account. He is then also required, or he should be, to indicate the effects on those plans if the unforeseen develops; if operations are much higher or much lower than is anticipated. This is done in every department and the regular form of statement which the department head normally receives is used as a work sheet. This prevents the introduction of a new unfamiliar form.

It should be stressed here that these budget estimates are made by the persons who operate the departments and spend the money and that they are not made by someone sitting in an office, guessing what will be done or forcing arbitrary decisions on operating heads. The whole atmosphere of the budget is cooperative planning and action and not the creation of a pressure device.

The various budgets are then consolidated, fitted together, coordinated, and balanced. At this state, adjustments may be made to provide for smoother operation. These adjustments are cleared with those who originated the first estimates. Finally, all of the information is put together just as it would be from the accounts at the end of the year. The difference is that this year has not yet happened. Thus a working pilot model is developed. This pilot model can be adjusted to determine the effects of various contingencies and of fluctuations in volume. Burden rates are determined, breakeven points are computed and a projected balance sheet and cash budget are prepared.

### **The Follow-Up "Budgetary Control"**

After the budget is finally accepted and approved, it becomes the standard with which to compare actual expenses and income during the year. As statements are issued periodically, actual results are very similar to those usually prepared by a company, except that ordinarily items of income and expense are compared with those of the same month of the previous year and the figures for the year-to-date are compared with corresponding figures of the previous year. With budgetary control the actual figures are compared with what they ought to be this year—with figures that are already accepted as satisfactory. Variances are thus readily apparent and "management by exception" is possible. Scrutiny of budget statements saves a great deal of time because the management knows what each figure ought to be and deviations are highlighted. It gives management assurance that vital points are not overlooked and also that department heads will know what to do in case the unexpected happens.

If deviations develop into trends, a projection of those trends combined with new current information forms the basis of new forecasts of what is likely to happen for the remainder of the year.

These may indicate a new and fairly accurate picture of changes in the profit, cash, and balance sheet positions.

With all of its advantages a budgetary control program is not costly. In fact, I believe that it costs nothing. It costs no more to prepare a statement comparing actual expense with the budget than it does to prepare a statement comparing actual expenses with prior expenses. Even the process of budget establishment is no more costly, and could very well be more efficient, than the hit and miss, frequently repeated but less thorough planning which is done where no budget exists. Furthermore, formal planning, the results of which are written down where everyone can get a good look at them, are far more accurate, better coordinated, and much more likely to be carried out.

### **Requirements and Benefits**

To successfully establish a budget program, one should have an understanding of the accounting system as it is and as it should be. Furthermore, one should understand the operations of the company. This includes what happens in the shop or behind the scenes of a store as well as what happens on the sales floor or in the field. In addition, one should be familiar with the problems of management, the things management is most likely to need, both for effective control and for the making of decisions. Finally, one should be familiar with economics both as applied generally to industry and as applied specifically to the company in question.

This is not quite as formidable as it sounds. These are matters of vital interest and should be quite familiar to everyone in business. The more technical and more detailed aspects can be obtained from the people within the company itself.

What does a budget accomplish? A well-designed, complete and integrated budget will go a long way toward accomplishing the following important objectives:

- (1) It requires that managerial employees plan ahead and crystalize their thinking. This includes all levels of management from the foreman or supervisor of a department to the president.
- (2) It induces coordination and cooperation of functions and departments and results in a well-balanced plan of operation.
- (3) It provides standards of comparison. These standards (the well-thought-out plan of operation, or budget) are far better as a basis for comparison than the previous year or other period which may not in itself have been satisfactory in all its aspects. The budget thus permits management by exception, saves time, and gives assurance to management.



- (4) It provides a proving ground for new policies or for testing possible changes, such as wage rate changes, pension plans, and new fields of endeavor or changes in emphasis.
- (5) It trains management replacement material. This is one of the most important requirements of management. Anyone who has the basic qualities of leadership and intelligence and has passed through successively higher jobs, in each one planning ahead, testing the outcome of his plans, finding out what is wrong with operations and doing something about it, and learning to coordinate his activities with those of other branches of the company, will have one of the best backgrounds available for a managerial position.

Many of you are in the public practice of Accountancy. What would it mean to you or to your firm and how would you benefit if you would

offer your clients a professional service of installing budgetary control systems and acting as a consultant on budgetary matters? It would do these things:

- (1) It would provide a means of giving your clients additional service of exceptional value.
- (2) It would establish a closer and continuing relationship with your client. This is true even after the installation, on a consultation basis.
- (3) It would provide off-season work. The client would be no more eager than you to work on budgetary installation with you when he is engaged in the throes of annual closing, and you with his audit.
- (4) In offering a consulting service in budgeting, the public accountant would tend to prevent inroads by some non-professional firms in this aspect of what could and really ought to be a part of the accounting profession.

## MANAGEMENT CONTROL THRU BUDGETS

By R. VISSCHER MILLAR\*

### Accountants and Budgeting

An Accountant's duties are varied. Sometimes he wears the historian's hat, putting down in the record the events of business life in terms of quantities and dollars. Much of the time Mr. Accountant is a reporter. He looks at the record he has compiled and interprets it. The diary of the company is kept by the Accountant and he is called upon whenever factual references are needed.

Knowledge of the Company and the accounts of course are essential for this work. So too is appreciation of the needs of those to whom he is sending data. The President is more likely to want over-all totals than minute detail. Department Heads want information about their own bailiwicks—not general Company data.

He has another function often glossed over too lightly. I call it "What if . . ." Management gets interested in a project—a reorganization, a new line of sales, or purchase of another company. In evaluating it they need an estimate of the probable effect on Profit. "What will it do to our tax picture?" "Will the increased selling expense be justified?" "How does return on investment look?" And a myriad of other questions that need careful, accurate answers before the final decision is made.

Under the "What if . . ." hat he has to find a crystal ball for he is looking into the future. Sometimes past performance yields a clue to probable effects of the proposed action. But often he must work by "seat of the pants." He is now approaching the field where he can be of maximum service to Management. When he is a "What if . . ." man he is interpreting a proposal in figures. But one can't add paragraphs and chapters into New Profit—it is only the dollars and cents that can be so treated.

One of the more interesting aspects of such work is that in effect, Mr. "What if . . ." Accountant stands beside Management looking at these plans. He is acting as Management's interpreter and as Management's test kit. He must see through Management's eyes.

Now we come to a newer segment of our Accountant's operations . . . his Budget hat. Wearing it, Mr. Accountant extends his "What if . . ." service to Management to a continuing function. Periodically he sets down a record of the future very much like the record of the past that is a more traditional duty. Also periodically, but usually more frequently, he sets the past and the future records side-by-side and compares them for Management.

Mr. Budget Accountant needs some additional talents for his work, such as the delicate one of acting for Management as a policeman, but most of the requirements are similar to those of other aspects of his work.

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The very nature of Mr. Accountant's work as a Historian, a Reporter and a "What if . . ." man assure that most of the abilities of a Budget Director are developed. For proof of this, consider how many effective Budget men you know who came up through Accounting.

Before we paint "Budget Director" on Mr. Accountant's door, let us see what the job includes. We want an Operating Budget—a plan of operations for a stated future period expressed in figures which is sufficiently complete so that a reasonable estimate of Net Profit may be obtained.

### Budgeting Principles

I propose to submit for your consideration Pennsalt's Operating Budget as a case history. It is by no means a finished product, although there are six or seven years of development behind it. But it does represent an integrated program that has been built step by step.

First, for some of the principles on which Pennsalt's Operating Budget is based . . .

1. A Forecast or Budget is always made by the operating unit that is responsible for or knows most about the phase of Profit being considered.

2. Although all Forecasts and Budgets are approved by higher levels and ultimately by Top Management, the figures as submitted are never changed unless the responsible operating executive agrees.

In Pennsalt operating budgets in the plants are set by the Standards Committees. Typically they consist of the Plant Accountant, the Foreman of the Process, his superior the Process Supervisor, and someone from the Engineering Department. That group estimates costs at each level of operations of the process; after approval by the Plant Superintendent this becomes the Budget.

Of course, usually it is not very difficult for the Plant Superintendent to convince the Committee that the Budget is too high. But this consultation between the two levels is more than a matter of form. Through it the Committee and every member of it—notably the Foreman—have ample opportunity to protest the reduction and if everyone agrees, later they cannot complain that it has been "railroaded." The Budget still belongs to the Committee; it has not become an arbitrary Management goal or "bogie."

The same principle holds in Sales Forecasting and Expense Budgeting. If a Sales Manager's estimate of future business is too high in the judgment of Management, the Sales Manager is brought into agreement before it is reduced. Or if a Division Head believes one of his Department Managers has omitted an important item from his Expense Budget, the Department Manager is consulted before the item is added.

"... the figures as submitted are never changed unless the responsible operating executive agrees."

3. No single Forecast or Budget is approved until its relation to others and especially to the Budget of Net Profit have been studied.

Consider a process with two alternative end products that cannot be manufactured simultaneously. Pennsalt in its Persulfate plant makes either Ammonium Persulfate or Potassium Persulfate. The plant shifts from one variety to the other rather readily but they cannot make both at once. Obviously the Potassium Persulfate Forecast of Shipments cannot be related to plant capacity without considering also the Ammonium Persulfate Forecast.

There can be only one Operating Budget—the Budget of Net Profit. All other Budgets are subsidiary to and a part of the summation.

4. Every Forecast or Budget figure has its actual counterpart. In building the Budget care is taken to assure that every estimate can be compared with actual results.

Early in 1946 the Vice-President of Sales greeted my return from Uncle Sam's employment with this assignment. "In December 1944 I asked the Sales Managers to let me have a complete Forecast of Sales for '45. They worked it up carefully and we thought it was pretty good. But in total it was more than 25% off. I want you to go over it and tell me what went wrong."

I never completed that assignment. Even several weeks of comparing the Forecast for '45 with the Sales totals of the Accounting Department got me nowhere. It was like comparing chickens with bulldozers.

Sales had stuck consistently to the grouping of products they worked with. There was detail only as detail was important to them—and you will understand that was infrequently! Accounting, on the other hand, assembled their data by plants, without regard to Sales Departments. (In Pennsalt, there is no correlation between the two organizations. Sales is broken down by the industry-consumers. Plants are organized generally by availability of raw materials.) So where products were sold by two or more Sales Departments it was almost impossible to sort out the shipments.

Again, Accounting would put all grades of an acid on one basis—say 100%. But Sales, not interested in strength of the acid, had added their figures on the basis of the strength shipped. 20% and 80% were lumped together. Comparison was almost impossible.

That was an excellent example of failure to match Forecast or Budget and Actual. From that mistake came a major program of standardizing on the identification of products in accordance with the needs of Sales, Production and Accounting; after that came a reorganization of Sales Accounting, so that records could be added either by Sales Departments or Plants. Those steps had to be taken before what is now the Pennsalt Sales Forecast could be born.

5. For every Forecast or Budget there is a Performance Report. The Forecast of every product

in the line is compared to actual Sales. Costs are compared—both volume and spending variances are determined. As the year progresses expenses are compared item by item with Expense Budgets, and when it is finished over-all comparisons are made. There are Budget Reports even on Income Taxes and Non-Operating Earnings.

The reasons for this insistence on comparison of Budget with Actual are several. In the first place, the interest of those doing the Budgeting is maintained if they see how their "guestimates" came out. They are reminded of them and given ample opportunity to question them.

Secondly, from these Performance Reports have come many improvements in both Accounting and Budgeting. A department Head finds that he has been charged for an expense that actually should have gone to a neighbor's account. He lets Accounting know about it—be sure of that! Recurrence of those errors results in improvement of the charging system. Or suddenly the Personnel Department finds their Budget for Company premiums on Group Insurance is being badly exceeded. A Plant Superintendent made a change in his part of the Plan unbeknownst to Personnel. The answer? The Budget was wrong; that item should have been in the Plant Budget—not Personnel's.

Finally, Performance Reports constitute a record that is valuable for preparation of future Budgets. If they are on a cumulative basis, the end of the year Reports are about all the "history" needed for work on the following year's Budgets.

### **Pennsalt**

Before getting into the mechanics of assembling Pennsalt's Operating Budget, let me introduce you to the Company. To understand the methods we use you should know that we are manufacturers of a wide variety of industrial and specialty chemicals. (The "Salt" in our name, by the way, comes from our use of the old staple as a raw material. We do *not* sell salt!)

Sales are about \$60 million on an investment of \$90 to \$100 million. We have nine plants at points from coast to coast and from Philadelphia and Detroit in the north to the Dallas, Texas area in the south.

Our organization is rather simple. Under the Board is the President with a small personal staff. Reporting to him are the Vice-Presidents and several other Division Heads. The Vice-President of Sales has nine Sales Managers, each heading a Department which serves a separate group of industries. Each Department is fully integrated, with national coverage and Regional and District Sales Managers as necessary.

The Vice-President of Manufacturing, on the other hand, has his Plant Superintendents—one for each of the smaller plants, and one for each major function in the larger ones. As I have already mentioned there is little or no relation between Sales organization and Plant organization.

Finally there are the Financial Division and other units in the administrative group. Pennsalt includes the Research and Development Division with this group.

This type of organization simplifies the construction of an Operating Budget. Following the usual Profit and Loss Statement, we get the Sales Division to do the Sales Forecasting, Manufacturing to give us Cost of Goods Sold, and each of the Division Heads the Selling and Administrative Expenses. The programming and coordination are done by a small group under the Secretary and Treasurer.

### **Building the Budget**

The Operating Budget itself is an annual affair. All elements of Net Profit are Budgeted by months for a year so that we come up with monthly Profit figures as well as the annual one.

The first step is the overall *Target*. The President and his staff set the keynote for the operation by specifying the Sales and Net Profit expected for the following year. This is a matter of deciding on the totals; it is not done from a detailed approach. Economic factors are carefully considered and the only Company angle is the effect on Sales and Profit of important plans for the new year.

Upon receipt of the Target from the President the Budget group passes it along to the Vice-Presidents and the Presidents of the Subsidiary Companies at the time the Budget schedule is announced. We have, therefore, a direction established for these Executives to follow in evaluating the detail that will follow later.

#### **First Preliminary Forecast**

Now we turn to the Sales Manager to start us off on building the detail. You will observe in Exhibit I that we give as much data as is available for the current year to help in Forecasting the next one. As this was started in late July of 1953 we could give the Sales Manager only six months record for the first stab at 1954.

The product is clearly defined—by name and code number—and the unit and the basis are also shown. One thing that the experience with the 1945 Sales Forecast taught us was to be exact in these matters.

We also call for a Forecast of shipments from each of the several plants where such an approach is applicable.

For each Plant the Sales Manager at this stage has the first two lines of the new year to fill. We make it as easy as possible for him. He uses arrows to repeat figures and shows the total year only if he wishes. All work is in pencil and there is no laborious typing or "dressing up." All we ask of him is volume of sales and expected price.

These so-called Forecast Books now come down to Forecasting and Statistics which is their permanent home. The people there do the extending,



## EXHIBIT 1

Code	NOI
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Product A	Product B
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multiplying volume times price, and adding. Totals from each shipping point for the year, and totals from all shipping points are derived. Then they add the products for a total for each Sales Department, which enables them to prepare the summary that is shown in Exhibit II.

You will note in the Exhibit that only ten products are listed. Actually this Department sells and is forecasting more than 40. But those ten constitute 80% of the Sales Forecast for the Department and consequently are worthy of nearly all the attention from this point on. We consolidate the other 30 items into "Other Products" and do not again list them in detail.

The summary goes back to Sales and it is the first time that the Sales Manager knows what the total is. We call it the "*First Preliminary Forecast*" and consider it so much a "shot in the dark" that it doesn't even go to the Vice-President of Sales. We recognize that since it was developed without regard to total dollars, a great deal of adjustment is necessary.

The Forecast Book itself does not go back to Sales—instead a photographic copy together with the Summary is sent. The original pages are on translucent paper to facilitate this shortcut. Sales uses a simple form for making the changes, noting their ideas on it in pencil with no copies and sending them directly to the Budget group. There the changes become new pages in the Forecast Book, and through a "control" the totals are adjusted.

Thus, assuming that the group keeps abreast of the volume of changes, we know at any time what the current total is, and can report to the Sales Manager how he stands even by telephone.

#### **Second and Third Preliminary Forecasts**

The Budget group now turns to the Cost System for "\$ Cost Unit." And here we find ourselves up against that old "chicken-and-the-egg" routine. Which comes first?

Sales maintains they cannot price without an estimate of costs; and without pricing they cannot do a good job on forecasting volume. On the other hand, Manufacturing says they cannot estimate costs without good volume forecasts. There is much to be said on both sides, and our Budget group would be presumptuous to say either Sales or Manufacturing is wrong.

Instead of that everyone compromises. We use the current year costs at this stage to apply against the next year's volume Forecast. That gives Sales enough information to firm up their Forecasts, and then Manufacturing can work out the next year's cost estimates. This compromise requires that the Budget group have a very flexible procedure for they must pick up Sales Forecast changes and the new costs as quickly as they come through.

So the current year's costs are applied to the next year's Sales. Again, this is done on the original pages of the Forecast Book, and new sum-

maries are prepared like that shown on Exhibit III. You will note that we have added costs to the summary.

At this point the volume information is passed on to the plants as very preliminary figures subject to considerable adjustment. Although they are not too reliable at this stage, they are a starting point, and Standard Committees start work as soon as they are received.

Forecast of Shipments received by the Plants is shown in Exhibit III. Note how the products are broken down into shipments and captive uses. This is an essential step, for the Foremen and their superiors are interested in what they will have to manufacture, regardless of whether it is going to the customers as finished goods, or to other cost centers or other plants for further processing.

To review: At this point in the development, each Sales Manager has a photographic copy of his Forecast Book revised to date, with a summary showing costs. The Vice-President of Sales has an over-all summary and is ready to start consultations with his Sales Managers. The plants have these early figures and where possible, are at work building the new year's costs.

#### **Expense Budgets**

Next are the Expense Budgets, like the one shown in Exhibit IV. Using one of the Expense Budget Progress Report forms, the Tabulating Department prepares worksheets for this step, showing the Expense Budgets for the current year, and the actual expenses for current year so far.

There is one of these Budgets for each of the Non-Selling Departments and several for each of the Sales Departments. As far as Sales is concerned, the most important distinction is between those selling expenses that are readily and accurately chargeable to products and those which go directly to the Headquarters of the Department. For instance, in the so-called "Product Selling Expense Budget" we include commissions to outside brokers where applicable, many of the ads on our products, and much of the direct mail activity. Cost of package labels—which in Pennsalt is considered selling expense—and depreciation on returnable containers also fall into this category.

We get a Budget on these Product Selling Expenses *by products*—so many dollars in total, or so much a percent of sales, or so many cents per pound sold. These figures are applied on the next to the last line of each block on the Sales Forecast pages, as you will see in Exhibit IV.

Having a Sales Forecast, a Budget of Cost of Goods Sold (albeit based on the current year costs), and Product Selling Expenses for each product, we develop Product Earnings. The attempt here is to limit this level of Earnings to those items that are readily and accurately chargeable to products—so that one may be compared with the other, and each with its own history

# EXHIBIT II FIRST PRELIMINARY FORECAST

....BUDGET GROUP  
EXTENDS, PREPARES  
COMPARATIVE SUM-  
MARIES AND RETURNS  
TO SALES.

PRODUCT A										100%		0872	
Product										Unit		Code	
Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year	
From Plant 1													
1,619,566	1,381,18	1,796,013	1,896,147	1,809,908	1,860,665								
0.012	0.012	0.009	0.007	0.015	0.012								
16,514.8													
0.911													
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Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of
Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold
Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.
Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.
1,619,566	1,381,18	1,796,013	1,896,147	1,809,908	1,860,665								
0.012	0.012	0.009	0.007	0.015	0.012								
16,514.8													
0.911													
57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150
Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of
Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold
Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.	Plant, Equip.
Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.	Product Mgrs.
1,619,566	1,381,18	1,796,013	1,896,147	1,809,908	1,860,665								
0.012	0.012	0.009	0.007	0.015	0.012								
16,514.8													
0.911													
57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150	57,150
Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of	Cost of
Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold	Goods Sold

1974 BUDGET

1974 Sales - August 1973

First Preliminary Forecast of Net Sales - Section 2

Department I - Section 2

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EXHIBIT III  
SECOND AND THIRD  
PRELIMINARY FORECASTS

1954 BUDGET

Third Preliminary Forecast of Net Sales and Cost of Goods Sold - October 14, 1953

Department III

FORECASTING AND STATISTICS  
DEPARTMENT

BUDGET GROUP  
(A) APPLIES UNIT  
COSTS, (B) RESUM-  
MARIZES AND RE-  
TURNS TO SALES,  
AND (C) CONVERTS  
DATA FOR PLANTS IN-  
CLUDING CAPTIVE USAGE  
AND INTER-PLANT SHIP-  
MENTS.



## REVISED FORECASTS AND EXPENSE BUDGETS

**SALES MAKES ANY NECESSARY  
REVISIONS IN THE FORECAST**

ALL DEPARTMENTS PREPARE  
EXPENSE BUDGETS

[illegible]

**BUDGET GROUP APPLIES  
PRODUCT SELLING EX-  
PENSES TO SALES FORE-  
CAST FOR PRODUCT  
EARNINGS....**



without the confusion of pro-ration and allocation of over-all charges. Product Earnings are added for each Sales Department to give a pool from which that Department will deduct its general expenses.

The latter are those expenses which are readily and accurately chargeable to the *Department* but cannot be so charged to the products sold by the Department. For instance, Salesmen's Salaries and Expenses: With a widely varied line such as most of our men are selling, no good formula ever has been developed for spreading such items to the products. We charge these general expenses to the Department and they are deducted from the pool of Product Earnings that already has been worked out.

So we have two Budgets for most of the Sales Departments—Product Selling Expenses and General Expenses. In addition there are the Budgets of the Administrative Units. With these turned into our Budget group, the summaries shown in Exhibit V can be worked out.

#### Fourth Preliminary Forecast

First there is the summary of the Forecast Book, showing Product Earnings for the major products—Sales, Cost of Goods Sold and Product Selling Expenses. Then we come up with the Department Earnings Statement on the left, where we have deducted from the total of Product Earnings the Headquarters and Field Expenses. And on the right is a type statement for the Company. Here we make the further deduction of the Sales Division Staff Expenses and Administrative Expenses for Operating Earnings.

All of these proposals are preliminary at this stage, none having been approved by even the second level of Management. They are simply the first attempt to fit together the pieces of the jigsaw puzzle, but the picture is hazy and distorted.

Here Division Heads come into action. The Vice-President of Sales weighs Expense Budgets against Sales Forecasts and direct adjustments. The Vice-President of Manufacturing begins to shape up his costs for the next year and gets the expenses of his Staff Departments in line.

Inter-Departmental operations such as the Research and Development program already mentioned are brought into line. There are conferences at all levels, and Budgets and Expenses are foremost in thinking of nearly everyone in the Supervisory group.

Out of it all comes the penultimate Budget, complete with Parent Company and subsidiary plans. Every element has been reviewed and very few have come through the process unchanged. The balance between expense and income has been adjusted; new products, new plans, and new facilities have been brought into the picture. The latest estimates of the national economy have been searched for their effect on the Company. We are ready now for the summary shown as Exhibit VI, the one that is presented to Top Management.

#### The Budget

This is usually a lengthy conference with the President, the Treasurer and the head of the Budget group supplying detail as requested from the mass that lies behind this summary. Division and Department Heads are called in for discussion of detailed figures . . . and very little change is likely to be made. Generally because of the intense work of the preceding months the President "buys" the Budget.

Approval accomplished, Pennsalt now has its next year's plan spelled out in figures both in detail and summarized to the ultimate Profit and Loss Statement. It is a fixed picture comparable to the artist's conception of the family car of 1983. It becomes a matter of record and a bench mark for comparison as we progress through the actual events.

#### The Latest Estimate

But an estimate of the future cannot be a fixed thing. Our artist's automobile must be redesigned when the internal combustion engine is replaced by a nuclear fission power plant with built-in fuel for the life of the car. He must adapt his impressions as new factors become apparent.

So with the Budget. To say in the Fall of 1953 what December of 1954 will be like is an approximation at best. Production cannot lay out its Fourth Quarter plans on that basis alone. The Treasurer cannot plan his cash on such a long-range guess.

And that is where the "Latest Estimate" comes in. The Budget—the approved, fixed, finalized *Budget*—is our permanent reference. But the Latest Estimate is a fluid, changing picture that reflects every new situation the Budget group can reduce to figures. This latest Estimate is built by extending the Budget principle. Just as the responsible Department Head, or the Department Head closest to an income or expense item, budgets it, so that same man also contributes to the Latest Estimate. He is responsible to report to the Budget group any change in the figures under his aegis. Sales Forecasts, new cost estimates, new or deleted or increased or decreased expense items, different tax applications . . . all of these figures are reported to the Budget group as they occur.

There is no periodic review; rather it is a channel of communication that never closes and that is greased for speed and simplicity. There are no forms, very little fixed routine, and only a few limitations. A Plant Superintendent can change a cost estimate by sending in a spare copy of the new data sheet. A Sales Forecast can be changed by a phone call. The Budget group may pick up a tax change in the newspaper, check with the Tax Accountant and introduce the change into the Latest Estimate. It is as simple as that.

The limitations to all these changes? They are simple and rather obvious. First, a figure for a month may not be changed once we are in that

# EXHIBIT V

## FOURTH PRELIMINARY FORECAST—PROPOSALS

### .... AND SUMMARIZES PRODUCT EARNINGS, DEPARTMENT EARN- INGS, AND OPERATING EARNINGS

1954 Budget  
Fourth Preliminary Forecast of Product Earnings - October 31, 1953  
Department VII

Unit	\$ Sales	Dollar	Cost	Cost of Goods Sold and	Product	Product	Product
Net Sales	per Unit	per Unit	per Unit	Delivery Exp. Expense	Earnings	Earnings	Earnings
					per Unit	per Unit	per Unit
601A Product S	105,000 ea.	95,165	86,517	\$20,631	\$22,846	\$2,166	39.14
9 mos. 1953	97,169 ea.	5,174	431,085	2,44,280			
611A Product T	105,000 ea.	5,411	119,106	2,6704	46,059	2,182	40.36
9 mos. 1953	97,169 ea.	5,061	87,254	2,8000			
700A		4,561	174,378	2,3000			
		4,614	6,676	2,3170			
		6,100	77,400	3,4698			
		4,8827	60,872	3,3000			
		10,1200	121,140	5,0458			
		10,1299	77,086	5,6325			
		275,977		139,74			
		240,726		134,151			
		31,371,806		873,17			
		945,912		290,			

#### 1954 BUDGET

Fourth Preliminary Forecast of Product Earnings and, Proposed Final Budgets  
October 31, 1953  
DEPARTMENT COMMENT

NET SALES OF ALL PRODUCTS (1)	\$0,000,000
Cost of Goods Sold and Delivery	000,000
Expense of all Products (1)	00,000
Product Selling Expenses of All Products (2)	000,000
PRODUCT EARNINGS OF ALL PRODUCTS	
Department Selling Expenses:	
Headquarters (2)	\$00,000
Regional Sales Supervisors (2)*	00,000
Salesmen (2)	000,000
	\$ 000,000
	(9 months 1953)

DEPARTMENT EARNINGS 1954  
(9 months 1953)

- (1) From the Fourth Preliminary Forecast of Product Earnings.
- (2) From the Expense Budget Proposals.

NET SALES	1954	9 Months 1953
Cost of Goods Sold and Delivery Expense	\$00,000,000	\$00,000,000
Product Selling Expenses	00,000,000	00,000,000
Department Selling Expenses	000,000	000,000
Sales Division Staff Expenses	0,000,000	0,000,000
Administrative Expenses	0,000,000	0,000,000
OPERATING EARNINGS	\$0,000,000	\$0,000,000

Forecasting and Statistics  
Department

FORECASTING AND STATISTICS  
DEPARTMENT

# EXHIBIT VI

## FOURTH PRELIMINARY FORECASTS—REVISED AND CONSOLIDATED

### DIVISION MANAGERS REVISE SALES FORECASTS AND EX- PENSE BUDGETS

1954 By Dept		Fourth Preliminary Forecast of Product Earnings, Prepaid Fixed and Subsidaries Budgets	
Parent Company		Consolidated	
NET SALES			\$40,000,000
Cost of Goods Sold and Delivery Expense			\$40,000,000
Selling Expenses			0,000,000
Office of the President	\$400,000		
Public Relations	00,000		
Washington, DC Office	0,000		
Executive Offices		\$400,000	
Financial Division		0,000,000	
Manufacturing Division (Phila.)		000,000	
R & D Division (Gross)	\$0,000,000		
Less: Charges to Others	-000,000		
Research and Development Division		\$0,000,000	
Personnel and Labor Relations Division		000,000	
Administrative Expenses (Gross)	\$0,000,000		
Less: Charges to Subsidaries	-000,000		
Administrative Expenses (Net)		0,000,000	
Total Costs and Expenses			00,000,000
OPERATING EARNINGS			\$0,000,000
Subsidiaries			
Personalt of Washington			0,000,000
Shurpiles Chemicals			000,000
Personalt International Corporations			000,000
Utilities			000,000
CONSOLIDATED OPERATING EARNINGS			\$0,000,000
		Forecasting and Statistics Department	



month. Second, no Expense Budget may be *increased* without Division Head approval. Third, the Budget group may refer any change to a Division Head or the President if it is believed to be of sufficient importance.

I can see that you are quailing at the thought of the mass of detail required to keep up with all these changes. You are right—there are many figures and it is exacting work to keep abreast of them. But we have two important short-cuts that relieve the burden considerably.

Remember the "major product" concept mentioned in connection with one of the early summaries of the Sales Forecast? That is carried throughout the year. After Sales, Production, Finance and the Budget group have agreed upon a list of major products, all of the others are put on a shelf . . . way in the back with a lot of heavy ledgers in front of them. We don't want any part of them, discourage changes in figures applying to them (and rarely get them), handling them as a total, "Other Products." For Sales Forecasts, Budgets of Cost of Goods Sold, and Budgets of Product Selling Expenses, this means reduction of the figure volume by more than 70%.

Secondly, we keep control figures on all the elements of Net Profit. These start with the first totals derived in each classification—Sales, Costs, Expenses and Taxes. Then when an item changes we subtract the old and add the new one continually showing the new totals. Occasionally we add all of the detail in one classification as a spot check on our control—but rarely is that necessary.

Thus, with a careful procedure within the Budget group to assure complete processing of every change, we are able to handle the whole job among six or seven clerks and clerk-typists.

Before I leave this "Latest Estimate" concept I want to emphasize the difference between it and the Budget. The Budget is a fixed guide that remains unchanged throughout the year. It is a summation of what each Budgeting Executive says is his plan for the coming year.

The Latest Estimate, on the other hand, is just what it is titled—the latest and best guess as to what actually the year will turn out to be. It is constantly changing and considerable effort is made to include in it anything that can affect Net Profit.

#### Performance Reports

On the left of Exhibit VII you will see how we show Daily Sales to Management. We break them down within the Parent Company by Sales Department, and show the more important subsidiaries by a total for each. The current sales are compared to the Latest Estimate—not the Budget—and to the figures at the comparable period of last month. Note that the entire Summary is cumulative, month-to-date.

And on the Daily Sales Summary are our thermometers—quick, graphic comparisons of Actual vs. Latest Estimate. We use those columns to

highlight interesting figures that might otherwise be buried in the statistical data. On the statement shown we have selected one of the Sales Departments; but we might show Parent Company's Sales to Customers, or one of the subsidiaries, or the Consolidated total, or even a section of one of the Sales Departments.

This Summary is on the readers' desks by 9:15 each morning covering the previous days' billings.

On the right side of Exhibit VII is our flash "Budget Report." We get it out monthly, and often it is the first report on a set of figures to reach the Management level concerned.

Here, for instance, we show the volume—not dollars—of a major product. On the chart is a cross-hatched column for the fixed Budget that was approved, in this case, in December 1952. Beside that is an open column for the Latest Estimate. And the lines show the Actual. This chart is cumulative, year-to-date—hence the general upward trend. You can see from the statistics on the lower half, that the line representing "Actual" at 10 months of the year is 13% over the original fixed Budget, and 10% over the Latest Estimate. For the ten months the Sales Manager raised his estimate 1,700 cases over the original Budget, but actually he shipped 8,300 cases more than his Budget. A pearl among Sales Managers: a conservative!

These Budget Reports cover the gamut of the Operating Statement—Sales, Costs, Expenses and Income Taxes. They are flashes—inexpensive to produce and rather widely distributed. No one is expected to file them; the intention is that the recipients check them briefly and toss them out.

Exhibit VIII shows our Directors' Report. This is a small collection of Operating Statements, Balance Sheets, and statistical miscellany carefully compiled for quick digestion by our Board. To the left is data for the month—in this case December. To the right is the year-to-date information. (These are actual figures, by the way, for the year 1952).

Every actual figure on the statement has its Budget counterpart. In '52 our Monthly Budget was a simple 1/12 of the Annual one. Since then we have refined the procedure to more accurately prepared estimates.

At the Board's special request the fixed Budget data are included in this Report, rather than the ever-changing Latest Estimate. They maintain that the comparison is between the organizations' plan and its results. Aside from the fact that there is excellent reasoning behind such comparison, we wouldn't be the ones to argue with them, anyway!

But they want the Latest Estimate, too. On the Statement No. 1 that is depicted in your booklet we overlay an insert (not shown) covering columns "E", "F", "G", and "H". There we apply our Latest Estimate figures for the balance of the year to the actual up to that point, coming up with our best guess as to what the year will be. It makes very interesting comparison with the original fixed Budget.



# EXHIBIT VII

PERFORMANCE REPORTS—DAILY AND PRODUCT SALES  
COMPARED WITH LATEST ESTIMATES OR BUDGETS

BUDGET GROUP COMPARES SALES FORECAST  
WITH ACTUAL DAILY....

## DAILY SALES SUMMARY

Product Group	Sales For the Month So Far	Latest Estimate -- Total Month	Sales at this Time Last Month
<b>FAIRFAX COMPANY</b>			
Industrial Chemicals	000,000	0,000,000	000,000
Agricultural Chemicals	00,000	00,000	00,000
B-K	00,000	000,000	00,000
Household Products	00,000	000,000	000,000
Laundry and Dry Cleaning	00,000	000,000	000,000
Metal Processing	00,000	000,000	000,000
Maintenance Chemicals	00,000	000,000	000,000
Corrosion Engineering Products	00,000	000,000	000,000
Sales Development	00,000	000,000	000,000
<b>Divisional Products</b>			
TO CORPUSCOPUS	000,000	0,000,000	0,000,000
To Personnel of Washington	00,000	00,000	00,000
To Personnel International	00,000	00,000	00,000
To Sharpless Chemicals	00,000	00,000	00,000
To Utilities	00,000	00,000	00,000
<b>FAIRFAX COMPANY</b>			
<b>Subsidiaries</b>			
Personnel of Washington	000,000	0,000,000	000,000
Personnel International	00,000	000,000	000,000
Sharpless Chemicals	00,000	000,000	000,000
Utilities	00,000	00,000	00,000
<b>Less: Inter-Company Sales</b>	-00,000	-000,000	-00,000
<b>TOTAL</b>	\$000,000	\$0,000,000	\$0,000,000

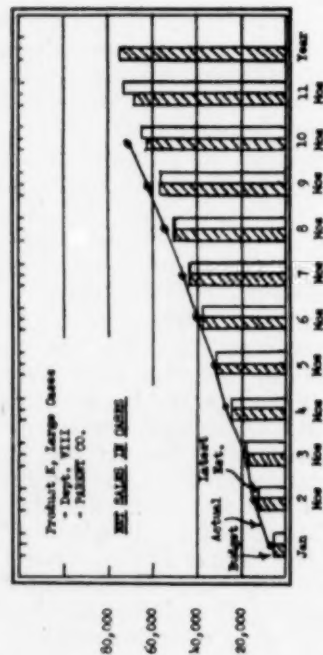
Date Issued November 12, 1953  
Summary No. 7 of 20 for the month

Distribution:  
Daily: M1, C20, D11, File  
Weekly: A7, M2, R10, R16, R41  
C20, C25, D11, R2, 10  
M15, T16, R12, 20

Forecasting and  
Statistics Department

## 1953 BUDGET REPORT

No. 372  
Issued Nov. 10



	Actual	1953 Budget		Latest Estimate	
		Amount	Difference	Amount	Difference
Jan	6,053 cases	6,390 cases	7.9%	6,390 cases	7.9%
2 Nov.	15,000 "	15,700 "	20.3%	15,700 "	20.3%
3 Nov.	19,122 "	19,090 "	0.4%	19,090 "	0.4%
4 Nov.	27,449 "	29,400 "	8.1%	29,400 "	8.1%
5 Nov.	33,260 "	31,790 "	4.6%	31,790 "	4.6%
6 Nov.	40,807 "	36,100 "	6.1%	36,100 "	6.1%
7 Nov.	47,293 "	44,490 "	7.1%	44,490 "	7.1%
8 Nov.	55,577 "	50,800 "	9.4%	50,800 "	9.4%
9 Nov.	63,389 "	57,190 "	10.9%	57,190 "	10.9%
10 Nov.	72,005 "	63,490 "	13.4%	63,490 "	13.4%
11 Nov.		69,490 "		69,490 "	
Year		75,190 "		75,190 "	

Distribution:

FORECASTING AND STATISTICS DEPARTMENT

....AND MONTHLY FOR ALL MANAGEMENT  
LEVELS

EXHIBIT VIII  
PERFORMANCE REPORTS  
—DIRECTORS REPORT

Statement No. 1

PENNSALT CONSOLIDATED

	(A) December 1952	(B) December 1951	(C) 1/12 of 1952 Budget	(D) Percent Difference from 1952 Budget
(1) NET SALES	\$4,681,986	\$3,380,691	\$5,002,200	-6.4
(2) Cost of Goods Sold and Delivery Expense	3,834,259	2,416,572	3,440,742	10.8
(3) Percent of Sales	81.9	71.5	69.2	
(4) Selling Expenses	327,179	273,055	386,817	
(5) Administrative Expense	408,054	314,670	375,433	
(6) OPERATING EARNINGS	112,494	376,394	779,208	
(7) Percent of Sales	2.4	11.1	15.6	
(8) Percent of Investment	1.5	6.0		
(9) Non-Operating Earnings	13,545	-232,850		
(10) Income Taxes	-134,261	2,002		
(11) Percent of Taxable Earnings	-109.7	1.1		
(12) NET PROFIT	\$264,300	\$143,544		
(13) Percent of Sales	5.6			
(14) Percent of Investment	3.5			

Statement No. 1

EARNINGS STATEMENT

(E) Year to-Date 1952	(F) 1951	(G) Proportion of 1952 Budget	(H) Percent Difference from 1952 Budget	(I) 1952 Budget (12 mos.)	(J) 1951 Actual (12 mos.)
\$54,688		\$60,026,400	-4.2	\$60,026,400	\$47,554,688
		41,528,900	2.5	41,528,900	30,501,502
		69.2		69.2	64.1
			-6.2	4,641,800	3,618,646
				4,505,200	3,261,493
				9,350,500	10,173,047
				15.6	21.4
					14.1
					15,930
					664,668
					65.3
					\$3,542,309
					7.4
					3.9

# MONTHLY REPORT

December  
AND THE YEAR  
1952

CONSOLIDATED FINANCIAL

THE BUDGET OF ALL  
ELEMENTS OF NET  
PROFIT COMPARED  
WITH ACTUAL FOR  
THE DIRECTORS AND  
TOP MANAGEMENT

These are just some of the Performance Reports that flow from our Budget group to the various levels that worked out the figures initially. There are others, some tabulated and some manual. We try always to keep them current and readable.

### Conclusion

So there you have it: an integrated Operating Budget in a medium-sized manufacturing Company, parts of it six or seven years old, parts being tried out for the first time for 1954. In my humble opinion it can be a real Management tool. It needs simplification, greater sensitivity, and wider acceptance before it has attained that goal. But the way from here to the goal is much smoother than the road we've already traversed.

I want to come back for a moment to our friend, Mr. Accountant. I said earlier that if that man

has the few necessary additional talents to be the Budget Director, there is no better man in the Company for the job. He has the training and the background to make the mass of detail of the Operating Budget a simple problem. He has accessible to him a picture drawn in figures that covers every corner of the Company. His training in "What if . . ." analysis has taught him to look at the future with respect and estimate it carefully.

So if in your Company there is need for a coordinated Operating Budget that has not yet been filled, I urge that you take the lead in the operation. If your Budget is fully developed and under another's control, back him to the limit with the actuals for comparison with his estimates. Your association with Budgets will bring you closer to the Management viewpoint than almost any activity in your sphere.

## WHAT MANAGEMENT EXPECTS FROM BUDGETING

By NELSON C. WHITE\*

The question for discussion, "What Management Expects from Budgeting," has been covered at great length on many occasions and by eminent authorities. Since the primary purpose of any business enterprise is to make a profit, I might tell you simply that the answer is "more profits." That answer is correct and complete, and further discussion can only supply supporting data as to how budgeting is expected to improve profits. While avoiding a too-lengthy approach, I will go into some detail on this point but before doing so would like to define the important terms in the subject.

### Definitions

What do we mean by *management*? The term is used regularly to describe the process of managing, the combined human ability involved in the process of managing, and the personnel who manage. In this discussion let us assume we are concerned with management people but must necessarily touch upon the process they follow and the abilities they use.

The process of managing divides itself into at least two basic elements: planning and controlling. While there are other possible divisions, this breakdown seems the simplest and also seems to include most of the others.

Planning should include at least three basic parts: *Objectives*, the setting of goals toward which the organization and each individual in it

can direct effort; *procedures*, the detailed outline of the steps to take in reaching the objectives; and *responsibilities*, the assignment of the steps of the procedures to organization units or individuals for which they will be held accountable.

Controlling requires the establishment of media to insure the understanding by all concerned of what is expected of them and to provide sufficient help and information to enable them to do it.

There are at least two media of control. These are not necessarily the only ones but they are basic. The first is organization structure, the medium which makes it possible for individuals to work together in groups as effectively as they would work alone. The second is supervision. Management gets what it expects only when it inspects.

Let us say then, that by management we mean the group of men charged with the operation of a business enterprise; that these men represent modern management of the type that does not feel it is perfect but does seek earnestly to discover its imperfections and plans systematically to eliminate them. Such a management has a philosophy; it has definite objectives, both short and long-range; it has plans aimed at these objectives. It has a well-designed organization to carry out these plans and its members have definite responsibilities and commensurate authority in controlling operations under the plans. So much for the term "management."

Now let's look at *budgeting*. Here is another term that is all things to men. Are we talking about an imposed straitjacket type of device designed to restrict and prevent intelligent inde-

\* Presented before the Chicago chapter, April 8, 1954, and published in Technical Notes, Vol. II, No. 8, May, 1954. Mr. White is General Manager, Potash Division, International Minerals and Chemicals Corporation.



pendent action, or a pressure device that is designed to be used on the organization like a whip? I think not, if we are talking about a process employing the following steps:

Establishing the level of business activity for the budget period. This requires the scheduling of sales, production inventories, and all items of income.

Estimating the monies needed for the budget period. This requires determining the materials and services needed to produce and sell as scheduled, including both expense and capital items.

Combining and coordinating all divisional or functional budgets in one master budget.

Regularly comparing actual results with budget schedules.

Making adjustments as required to maintain (as far as practicable) budget schedules.

And, most important step of all, having all of the foregoing items a joint effort on the part of all management, with each man participating in the establishment of any objectives and plans over which he is expected to exercise control.

Budgeting, therefore, in this discussion, means the setting of attainable goals and then so controlling and limiting variations from the plans to reach them that the goals are attained.

Note the considerable correlation between what management is designed to do and what one does in budgeting. The difference may be considered slight; in another sense it is tremendous. The basic elements of the management process are planning and control. Budgeting as we have described it is planning and control. Planning in budgeting, however, is concerned only with *what* is to be done; planning in management depends finally and completely on getting people to do it. Control in budgeting is also concerned only with "what" control in management comes back to "who." The difference is tremendous because management is *not* the direction of things but the direction and development of people. Management is taking people as they are, with what knowledge, training, experience and background they have accumulated, and developing these people by increasing their knowledge, improving their skill and correcting their attitude and habits. Management is therefore part art, part science, part profession. It is an art requiring skills; it is a science because some of the basic know-how is available; it is a profession because men make it a life career. As of today its status is not too different from that of medicine a couple of centuries ago. In those days men became doctors by studying under a successful practitioner, learning by seeing it done and gradually taking over the doing, supplementing this apprenticeship with reading the gradually increasing written record of theories standing the test of time and by verbal exchange of ideas and practices with their contemporaries. Today men progress in management ability by the

same route. Like the doctors, they are dealing largely with people where even in the narrow range of business life the tangible factors are outweighed by the intangibles. Add to this problem the effects of the many variable and often little-understood outside forces that affect the course of business, and you must agree that the science of management is still so imperfectly developed that great reliance must be placed on the high development of skills. Competent and successful management must therefore be able to learn quickly and continuously to maintain a place in our dynamic economy, and much of this learning must come from practice. It must have, for this practice, the best possible tools.

### Developing Management

With our definitions and basic premises established we are finally prepared to examine in some detail how budgeting, as a tool of the management process, helps develop management people by properly modifying their knowledge, skills, attitudes, and habits; and thus provides a more profitable operation.

We have stated that the management process divides into planning and control. *Planning* is further divided into setting objectives and then mapping the path to reach them. Let's look at some of the specific knowledge and skills required to apply it that management people need for competent budgeting.

They must be able to judge the probable effects of changes in the overall economy on their business and must estimate the probable trend in this economy. The classic example here is the sharp increase in red ink production required by a depression. For small business, local conditions may be more important than national, since circumstances short of a major boom or bust often cause local factors to vary greatly in degree and even direction from national indexes. Big business, if truly national, can minimize local studies; most, however, must modify national figures by considering trends in the areas in which their business is concentrated.

Management must know its own business, its position in respect to competition, possible changes in position due to action by competitors. Competition may come from others in an identical business or from those in the same general field, like the competition between rail and air travel, between brooms and vacuum cleaners. Management must know trends. The trend in chlorine consumption in this country was a fairly steady 10% per year increase in the ten years before World War II. The terrific increase in overall production because of the war plus Korea moved this figure up only to 12%. With no substitutes known and only one process involved for its production, checking the probable market and competition was fairly simple. As of right now, however, it appears that even with business levels maintained high, growth of this market is at a

much slower rate than in the past. In International's Potash Division some 75-80% of our sales are as material for fertilizer production. For many years in the past, the correlation between farm income and fertilizer sales was remarkably exact. Present figures indicate a change is occurring in this relationship. Knowledge of these and similar factors has to be acquired and developed for proper budgeting.

Management has usually felt sure of its ability to produce and sell in any given market. Integrating this knowledge with the market established by the studies previously mentioned makes it possible to set good *objectives*; for instance, the sales and production budgets.

The second element of planning is the preparation of the detailed *procedure* to follow in reaching the objectives: How much labor, equipment, materials, supplies, utilities and overhead services are required to meet production quotas? Will all requirements of all items be available for a production rate matching deliveries to customers, or must inventories be used as a flywheel to level out differences in rate? With quantities set on all these items and others making up the manufacturing budget, what about costs? Will materials and supplies tend to vary in price during the budget period; if so, how much and what steps should be taken to protect against increases or take advantage of decreases? What about labor costs? Will rates stay constant during the budget period or does a contract opening signify a change is likely? If a change, how much will be required to maintain continuous operation and is the company willing to accept it? If not, what is the cost of refusing? With these individual costs carefully established, total manufacturing cost is available.

What about the effort required to sell the established quotas? Will it be the same as last year or have changes in conditions been sufficient to require changes in the sales campaign? If more effort is required will it be in direct selling or promotion and advertising, or some of each? Here again, careful consideration of each factor is required for a dependable total.

What administrative services are required to maintain proper coordination of company units and how much will they cost? Bearing in mind the first duty of business is the generation of profits, how much can we justify for grants to educational institutions, contributions of time and money to civic betterment, and similar items?

With expense items carefully estimated and assembled, capital requirements must be studied. If for normal replacements, has depreciation provided sufficient funds for the new installation? If revisions or additions are contemplated, is the rate of return sufficient to meet company standards?

Having scheduled the costs of operating, we can now combine these with expected sales revenues and get the big answer—the estimated operating profit.

With the P & L figures and the capital requirement estimates the cash position of the company at all times in the budget period is indicated. If new money is needed, when is it required, in what quantities, and what is the best way to obtain it? If more will be on hand at times than needed in normal operation of the business, how can it best be utilized in other ways?

Answering all these questions is necessary in the planning and coordinating required by competent budgeting. Management planning requires the development of people who can supply these answers correctly. This certainly presupposes taking people as they are and increasing their knowledge and improving their skills, since yesterday's knowledge and skill is almost certain to be deficient for supplying tomorrow's answers to the same questions. Raising the individual questions and checking the answers regularly forces the search for new facts and the development of skill in using them.

Let's now look at the second basic element in the management process—*control*—and note how budgeting, a control device, aids in the development of management people. We have said that management control requires the establishment of media to provide people with knowledge of *what is expected* of them and information and help to enable them to meet these expectations. Although we ran through an entire list of planning functions in budgeting, without pausing, controlling was operating at all times during this process. Certainly, after cost of sales was obtained, revisions in the ratio of products manufactured and sold could be made if manufacturing profits could be increased by scheduling more high-profit items. Certainly more or less capital could be considered when returns on the investments were estimated. Thus, even in the preparation stage budgeting provided for practice of control.

In operation, the regular comparison of actual results with estimates provides the necessary detailed information for showing the location and extent of any variations. The effect of action taken to control variations can be measured in subsequent comparisons, including occasional side effects, either good or bad, not contemplated when control was applied.

Proper use of a budget as a control device provides the most obvious demonstration of its value in developing management people. It shows where to impose controls and how effective those used were. Certainly it is difficult to conceive of a better program for increasing knowledge and skills in managing. The controlling of items where variations affect other people provides an equally obvious lesson in the necessity for complete cooperation between and coordination of all units of the organization. If, as we have presupposed, the budgeting program was one of complete participation, working with it is bound to influence habits and attitudes in a favorable manner. For instance, passing the buck is difficult if the passer

willingly took a firm grip on it in the planning stage. Thus budgeting assists in the third type of development of people required of management.

### Summary

Although the items I have mentioned as examples were only a few of the many available, I assumed we could agree on their importance, since I tried to work with subjects which had been topics for discussion at previous meetings of this group, including:

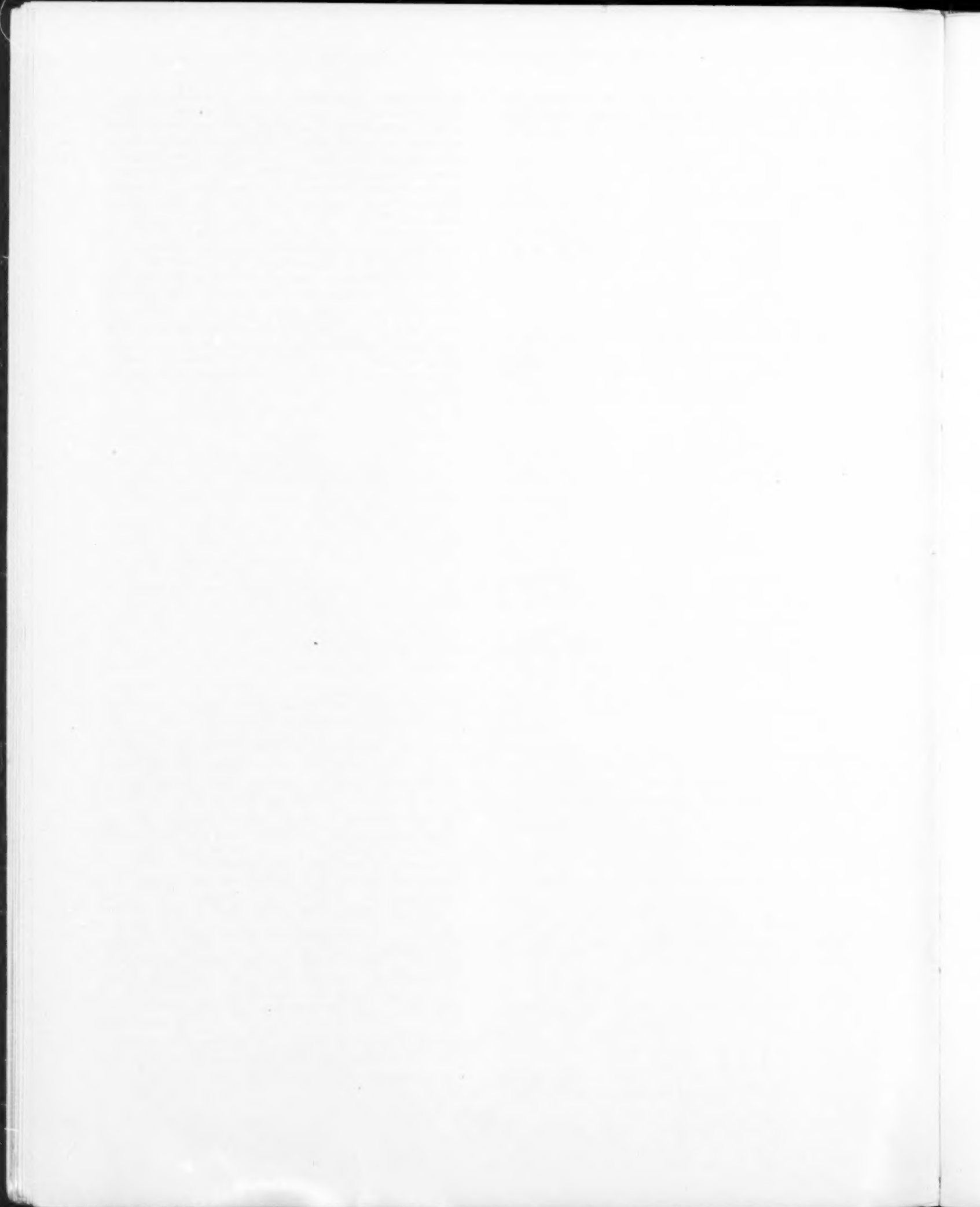
1. National Economic Trends
2. Forecasting
3. Manufacturing Expense
4. Management Coordination

Perhaps, since most of you are closely associated with the process of budgeting, it is desirable to get an occasional opinion from those for whom

it is designed. As one of these, I'll make one more point: It might be said that all the gains I've mentioned came from managing, per se; the budgeting was only incidental. I will agree that business can, like the filly-lou bird, fly merrily on with the good accounting system, that everyone agrees necessary, telling them exactly where they have been. This is fine as long as they go in the right direction, but if they get off-course they are apt to arrive at the wrong place before they know where they are. Proper budgeting provides information before the fact, rather than post mortem; and thus in addition to aid in plotting a safe course shows when you go off it, helps in getting back on.

Let me summarize, then, that management expects budgeting, probably the single most-valuable and comprehensive tool in its kit, to provide major assistance in management's primary task—the development of people to insure a more profitable operation.





## **PART II**

### **FORECASTING AND PLANNING SOURCES, FACTORS AND RESEARCH METHODS**

- 1. The Business Outlook for 1954**
- 2. The Economy Ahead—An Econometric Approach**
- 3. Operations Research as an Aid in Planning**

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# THE BUSINESS OUTLOOK FOR 1954

## Milwaukee Chapter Panel as of November 1953\*

The "prophets of deep gloom" got no encouragement from the Milwaukee Chapter when it discussed the many divergent factors in the business outlook for 1954. The Milwaukee discussion was based on a panel presentation of seven chapter members, each of whom discussed the outlook for the field in which his company operates:

### *Investment-Goods Industries*

Construction: A. H. Weiss—Harnischfeger Corp.  
Agricultural, Industrial and Utility Equipment: C. A. Koller—Allis-Chalmers Manufacturing Company  
Petroleum and Automotive Equipment: R. O. Willmore—A. O. Smith Corp.  
Machine Tools: E. R. Doehr—Kearney & Trecker Corp.

### *Consumer-Goods Industries*

Light Metals: A. Schick—Geuder, Paesche & Frey Co.  
Paperboard: S. Grady—Marathon Corp.  
Retail Trade: E. S. Waterbury—Ed. Schuster & Co.

The discussion of the 1954 outlook was slanted to the outlook for Wisconsin industry in contrast to a study of the outlook for the whole United States. Wisconsin industry is characterized by companies which produce either multiple-product lines that are sold to many different industries or single-product lines that go to various industries. It was pointed out repeatedly that foreseeable conditions in specific markets justified forecasts of increased sales of as much as 35% in some markets to decreased sales of as much as 25% in other markets. In some cases it was indicated that, although the outlook in general for a particular company's industry might be down, individual companies within that industry expected increases which would be contrary to the general trend in their own field.

Milwaukee concluded that the high level of activity attained in 1953 would be maintained or exceeded by some industries and companies in 1954. Other industries and companies could expect lower volume for 1954. No sharp drop from the 1953 rate was forecast for "business in general." Instead, moderate adjustments—slightly downward—were expected to characterize 1954 in the main. Hence, it appeared that each com-

pany needs to analyze the factors controlling its operation and not rely upon "general forecasts" when making plans and budgets for 1954.

Although the general level of activity for 1954 may be 5 to 10 percent below that of 1953, individual companies will have to depend upon aggressive sales policies to hold volume and cost control (including improved efficiency) to preserve earnings records.

The Milwaukee discussion of the Outlook for 1954 was based on a panel presentation by seven Chapter members who discussed the "Outlook" for the particular fields in which their companies operate.

The conclusion was inescapable that a significant development in 1954 probably will be a sharp change in the "Sales Mix" obtained in 1954 when comparisons are made with the Sales Mix obtained in 1953. Therefore, recognizing that 1953 had been a year of extremely high industrial activity, it was considered likely that broad indices of general business activity for 1954 were expected to be higher than the figure obtained for 1952—which was then regarded as "a good year." In general, no sharp decline was expected unless important segments of the economy became seriously affected by droughts—as happened in 1953—or a wave of serious strikes based upon Unions striving for guaranteed annual wage plans in 1954.

### **Investment-Goods Industries**

#### **Construction**

*Industrial.* Companies supplying heavy equipment to the industrial field naturally sell to a variety of markets. It was believed that some of these markets would buy heavy equipment in substantially less volume than they had in 1953.

The steel industry, for example, was expected to buy heavy equipment in decreasing amounts—even up to 24% less than they did in 1953. In contrast to this forecast the automotive industry, electrical industry, the packaged-foods industry and certain other industries were expected to buy more in 1954—even up to 15% more than they ordered in 1953.

In November, it looked like the construction industry might expect a high volume although this level probably would be about 4% less than obtained in 1953. Inasmuch as the projections for this industry in recent years usually have been conservative, a question was raised as to whether current projections of a slight decline for 1954 might not actually turn out to be "conservative figures" for 1954.

\* Adapted from Technical Notes, Vol. II, No. 3, December, 1953, A. H. Weiss, Editor. This forecast, pertaining to a year now completed, permits the reader to use "hindsight" in appraising its adequacy. It may also be compared with the "Econometrics" forecast which follows it.

Some companies in the industry expected that their own 1954 activity would show an increase over 1953 which they expected would be a trend contrary to the trend in the industry.

A summary of estimated expenditures for new plant and equipment follows:

**SPENDING FOR NEW PLANT AND EQUIPMENT**  
(Millions of Dollars)

	Est. 1953	Plans 1954	Increase or Decrease
Steel.....	\$ 1,460	\$ 1,108	-24%
Automobiles.....	923	1,063	+15
Machinery.....	899	805	-10
Electrical Machinery.....	463	512	+10
Transportation Equipment.....	215	196	-9
Food.....	841	841	0
Petroleum.....	2,824	2,757	-2
Chemicals.....	1,800	1,546	-14
Textiles.....	296	260	-12
Other Manufacturing.....	2,969	2,595	-13
<b>TOTAL MANUFACTURING</b>	<b>\$12,690</b>	<b>\$11,683</b>	<b>-8%</b>

**Housing.** Housing in 1954 was expected to continue at a high rate with at least one million "starts" being made in 1954. The type of house that will be built in 1954, however, will be different from those built lately. The declining trend for homes that cost \$20,000 or more will definitely continue into 1954. However, there was expected to be a very good market for homes costing between \$11,000 and \$14,000 with major house building activity in 1954 being in prefabricated houses that cost less than \$11,000.

It was expected that this building activity would develop because most people want to own their own homes and because of the stimulus that will develop from further rent increases. Since rental rates have increased more relatively than have home construction costs in recent years, this situation still makes home owning a strong factor for continued high volume in home building.

The construction industry—both commercial and residential—was expected to operate at a high rate in 1954 (perhaps not as high as 1953 but very close to it). Although the backlog of industrial construction may decrease, this was not considered to be a retarding factor on the 1954 level of activity. Intense competition for business undoubtedly will increase. The experiences of individual companies may vary widely—either up or down—from the experience of the industry in general.

**Road Building.** It was recognized that 1953 had been a year of high activity in road building. Because the country as a whole still needs to rebuild its roads, this activity was expected to continue in 1954. Results of this primary demand, however, were expected to affect individual manufacturers in different ways.

Manufacturers of materials such as cement were expected to find a good market in road building in 1954. Manufacturers of road building equipment were not expected to enjoy a strong market. The government has purchased road

building equipment in considerable quantities during recent years and is not expected to be "back in the market" for one or two years. Contractors have been buying new road equipment in considerable quantities mindful of possible future restrictions upon purchases due to "cold war" conditions. Inasmuch as contractors' equipment now operating is relatively modern and in good condition, it was expected that there may be a 12% to 15% decline in volume over the next 12 to 15 month period. However, the sale of repair parts was expected to supplement the sale of new equipment so that the total decline was not expected to be more than indicated.

**Agricultural, Industrial and Utility Equipment**

**Farm Implements.** Farm income has been declining in the past two years and perhaps the best way to measure this decrease would be to compare it with total National income. The table below shows this comparison with the percentage of farm income to total National income:

	National Income	Farm Income	Percent to Nat. Income
September 1952.....	290.4 (billion)	15.2 (billion)	5.23%
December 1952.....	301.4 (billion)	14.0 (billion)	4.64%
March 1953.....	306.7 (billion)	13.4 (billion)	4.37%
June 1953.....	310.7 (billion)	12.3 (billion)	3.96%
Year 1954 (Estimate) ..		12.0 (billion)	

The drought in the southwest has primarily affected the cattlemen in that area. Beef prices have declined as cattlemen disposed of their stock because of lack of feed.

The Department of Agriculture has set up a program designed to assist the cattlemen as follows:

1. Providing emergency credit loans.
2. Providing low-cost feed, with price cuts of 50%.
3. Appropriating ten million dollars for hay.
4. Buying 750,000 head of cattle, which is disposed of through foreign outlets, school lunch programs and federal institutions.
5. Inducing the railroads to reduce freight rates on cattle and feed.
6. Promoting the use of beef—1953 consumption about 30% over 1952 and near a record 75 pounds per capita.

The effects of the present drought, however, will carry over until 1954. The price of beef will increase after the present surplus is depleted and a measure of relief will be provided for the cattlemen who have stock available for the market.

In the year 1953, a majority of the manufacturers of farm implements were forced to make drastic cut-backs in production. This was due primarily to high inventories, the drought, declining farm income, and a reluctance on the part of the farmer to over-buy as he has in the past. Only last January, allocations of materials to this industry were still in effect. After government controls



were off, the industry purchased large quantities of material, resulting in over-production for the immediate months ahead.

The outlook for 1954, however, is far from being unfavorable. The past three or four years were ones of high production to satisfy the needs of the farmer for mechanized equipment. The trend is now definitely back to the seasonable pattern which was common to this industry before the war years.

Other factors to be considered in 1954 are as follows:

1. Farmers' buying habits have changed from the conservative basis of pre-war years.
2. A second tractor and mounted implements are still very much in demand.
3. Technological advances in the industry will create new markets.
4. Farm labor will continue to be a problem, thus enhancing the position of the implement manufacturers.

Some of the manufacturers in this area do have the problems of liquidating present inventory. Others will be faced with a slight decline in their repair business as dealer stocks are high. The over all picture for these manufacturers, however, will be relatively favorable for the year ahead, as the industry swings into the seasonable pattern. In general, sales will be down about 15% and production about 25% in spots.

*Steel and Utilities.* In the summer of 1953 there had been forecasts that the steel industry would be operating at 90% capacity during the third quarter. Actual results were that the third quarter operating rate was at 95% of capacity. In general, it was expected that the steel industry would probably operate at 85% of capacity or higher during 1954.

Such a projection might be taken to indicate that the industry might be expected to go through a sharp readjustment period in 1954. It was believed, however, that such an interpretation did not recognize that that capacity of the steel industry has been sharply upward in recent years. Since the steel industry operating at an 85% capacity rate would produce 100 million tons of steel, it was believed that this should be considered as a good rate of operation for 1954 because such a production rate has been exceeded only in 1951, 52 and 53.

The profits of the steel companies were expected to be at least as high as their profits in 1953. This forecast was based on the fact that, in any readjustment downward of steel activity, the plants that would be taken out of operation would be the lower, least-efficient plants so that economies undoubtedly would result from operating the newer and more efficient plants. Although there were indications that profits might be higher because of the elimination of the Excess Profit Tax and the operating of the most efficient plants, it

was considered likely that steel prices would be shaded somewhat in 1954 when companies were competing to maintain their volume.

Recent experience has been that the amount of electrical power generated has been doubling every ten years. The operating rate is now 33% higher than it was in 1950. Plant expansion of the electrical utilities was expected to continue until 1955 and 1956. Therefore, those companies supplying electric generating equipment, transformers, and related materials were expected to enjoy a good demand throughout 1954. The amount of power generated in 1954, however, might decrease slightly unless threats of new wars developed that would raise the general level of industrial activity.

#### **Petroleum and Automotive Equipment**

Most of the information I am about to pass on to you was made available to me through the courtesy of our Market Research department.

The future activity of the petroleum and automotive markets determines the potential sales of five of our products. These products are:

1. Welded Line Pipe and
2. Casing
3. Processing equipment for the oil refineries
4. Frames and
5. Control arms for passenger cars and trucks

To estimate the petroleum industry's tonnage requirements of tubular products, it is necessary to consider the amount of oil well drilling activity to be expected, and the number of gathering and transmission pipe lines to be built for the transportation of crude oil, natural gas and refined products. Since the number of wells being drilled is continually increasing, it is expected that casing tonnage will continue to rise. Over the past five years the average annual increase in casing has been about 6½%. Assuming that this rate of increase will continue in the coming year, casing tonnage shipped should be about 1.5 million tons in 1954, as compared with 1.4 million tons estimated for 1953. I might point out that if casing shipments increase due to increased oil well drilling activity then undoubtedly shipments of other equipment used in drilling oil wells will also increase.

The usage of line pipe for natural gas transmission lines is expected to decline in 1954 as compared with 1953. In fact, because the extension of such pipe lines has been made to most of the major consuming areas, it is expected that the building of pipe lines will continue to decline beyond 1954.

However, the decline in natural gas lines is expected to be more than offset by an expansion in crude oil and refined-product pipe lines. It appears, therefore, that 1954 demand for line pipe will be at least as great as 1953 and possibly slightly more.



What about the expansion of oil refinery and processing facilities? Our market research people are currently wrestling with this problem and as yet have no definite answer. Since I was unable to obtain their views on the subject, I am taking the liberty of injecting, at this point, some of my own observations.

In view of the current surplus of refined products, to me it appears unlikely that capital expenditures in 1954 for refinery and processing facilities will be as great as in 1953. This viewpoint can, I believe, be supported thru the use of the McGraw-Hill capital-expenditure survey. This survey indicates that capital expenditures by the Petroleum industry will decline about 2% in 1954 over 1953. Now if we can assume that our estimate of shipments of tubular goods and oil well drilling equipment to the industry are correct, then shipments of these products will show a small increase and this would mean that a decline of something greater than 2% is indicated for expenditures for refinery and processing facilities. The McGraw-Hill survey indicates total expenditures by the industry in 1953 of \$2,824,000,000. Another publication, *The Petroleum Refiner*, estimates 1953 expenditures for refinery and processing facilities at \$1,085,000,000, or 38% of the total figure given by McGraw-Hill. If we assume that the over all increase for tubular goods and drilling equipment will be as much as 3%, then the decline in expenditures for refinery and processing facilities will run about 10%.

So much for the petroleum industry. Let's turn our attention now to the automotive industry.

It appears likely that 1953 production of passenger cars and trucks will be within 10% of the all time high of 8,000,000 produced in 1950. In 1951 a government cut back of steel allotments resulted in a decline to 6,750,000 vehicles. The steel strike in 1952, reduced the number produced that year to 5,540,000.

1953 production should be about 7,370,000 after reflecting the 4th Quarter cut back. This cut back is due to the difficulty that dealers have been having in selling cars during the past several months. However, the 4th Quarter production would be at an annual rate of 6,300,000 which, as pointed out by *Business Week*, is still very good when one considers that the 4th Quarter is normally the season's lowest.

Current estimates of 1954 auto production range from a decline of 10 to 20%, from 1953 levels. On this basis the number of cars, produced in 1954 will be between 5,900,000 and 6,600,000 as compared with 7,370,000 for 1953. For passenger cars only, production will range between 5,000,000 to 5,600,000 as compared to 6,200,000 for 1953. I understand that current estimates by Ford and Chrysler place 1954 passenger car production at 5,000,000. This, of course, represents a 20% decline.

Referring again to the McGraw-Hill survey we find that the automotive industry is planning for 1954 a 15% increase in capital expenditures. This

represents the largest increase in capital spending of all the industries surveyed. The 15% increase in capital expenditures in face of a possible 10-20% decline in product output is explained as meeting increased competition thru installation of more modern equipment, adding facilities for the production of automotive transmissions and other special accessories, and getting ready to produce new models.

#### Machine Tool Industry

Thus far in our country's history when there was war or threat of war, the machine tool industry was suddenly swamped with a volume of defense orders far beyond its capacity. Then, after it had built up its capacity to meet the emergency, the government-owned machine tools were thrown upon the open market when peace came again. This direct competition with new machines being built by the industry forced the industry into the doldrums. Then along would come another defense crisis—and the whole cycle would be repeated all over again. The main reason for this recurring picture is that the United States in the past has always thought of war or defense purely as an emergency proposition.

Today our entire attitude has changed. We recognize that as far as we can see ahead, national defense must not be erratic but a continuing program.

The problem of government-owned tools no longer needed for defense work is again facing the industry. It is being studied in Washington. There are several alternative solutions. One course of action would be for the government to sell these machines in the open market in competition with new machine tools now being built. This would lead to a recurrence of the situation which developed when this program was followed after World War II. The result was to depress the industry to such a low level that it was utterly unprepared for the defense emergency which arose with Korea. Everybody is agreed that from the standpoint of military preparedness the industry must be maintained at a reasonable rate of capacity.

All is not gloom, however. According to the trade paper *Machine Tool Progress*, the sharp decline in new orders for defense purposes has been largely offset by the increase in orders for machine tools for civilian purposes. Since Korea our more competitive business conditions have emphasized the need for modern machine tools to cut costs. The report also states that at the end of September the backlog for the industry stood at seven months production. This is the lowest backlog since before the Korean war. At the height of the Korean emergency, backlog reached 23 months. It has now been whittled down to where customers can get normal deliveries on the types of machine tools they want.

Eliot Janeway, the consulting economist, predicted in a talk before the American Machine Tool Dealers Association that continued high demand

for machine tools would defy gloomy forecasts by those who persist in tying the industry to cyclical ups and downs. He relies upon "labor-cost inflation," pressure of competition for lower prices of goods, a backlog of civilian orders accumulated in 1950-52, more liberal depreciation allowances, and new defense tooling programs for support of a "boom" in machine tools.

Shipments according to the *Machine Tool Index* now appears to be off about 15% from the previous nine months' level. This seems to have been the peak level so far as shipments for the entire industry are concerned.

The *American Machinist* in a recent issue says that machine tool sales are holding up very well. The situation admittedly is not uniformly good with all companies. Production still is high by whatever standards that you may apply. It will continue to be high the remainder of the year. After that shipments are likely to shrink. This does not mean that the decline in operations in builders' plants would be as great as the drop expected in dollar volume. At least some of the shrinkage will come from the dropping off of sub-contractors. A number of sub-contractors will clean up their commitments by December and their machine tool building will then cease.

Some builders complain that the amount of pending business has dropped sharply. Others report that inquiries are heavy. A large number have second shifts at work while some companies are down to a single-shift basis with that shift working overtime. Potential machine tool business is large. Many orders have been placed by the automobile industry for delivery late in 1954 and even into 1955. Backlogs of some makers of special-purpose machine tools are actually getting bigger according to *The American Machinist* magazine. So much for the industry in general.

Our own statistician tells us that Kearney & Trecker sales over the past twelve years represented approximately 4% of the total sales volume of the machine tool industry. For this same period our company supplied approximately 35% of all general-purpose milling machines. Kearney & Trecker sales for the fiscal period ending September 30, 1953, were approximately \$47 million. Shipments are expected to continue at the 1953 rate well into the second quarter of 1954. Our backlog has declined to about \$25 million from the \$50 million a year ago. Our shipping volume for 1954 is not expected to decline by more than 15% from the 1953 level. The 1953 volume included a substantial amount of sub-contracting which is scheduled to be dropped by December of this year. 1954 shipments are predicated largely upon production with our own facilities and include very little sub-contracting.

### Consumer-Goods Industries

#### Light Industry—Metals

This industry was also predicted as being one in which the 1954 sales mix would undoubtedly be radically different from the sales mix obtained

in 1953. The industry serves a variety of markets in which the demand was expected to change from market to market including a change in the "buying habits" in some markets. Changes ranging from a decrease of 11% to an increase of 35% in respect to individual product lines were expected. Price competition was expected to increase. The outlook for the total industry was expected to be somewhat downward but companies able to reduce their operating cost so as to obtain price advantages were expected to have an activity rate higher than that of the over-all 4% decline expected for the industry.

Manufacturers' inventories were expected to decrease, inasmuch as steel has become plentiful. Steel prices were expected to decrease either through concession or by the absorption of freight rates by steel manufacturers. Therefore, the profits in 1954 were expected to be as good for some manufacturers as they were in 1953. Employment provided by some manufacturers was also expected to be as good as in 1953—especially in the case of those companies which move contra to the industrial trend.

Government contracts placed in the "light metal" trades were expected to decrease sharply so that they would be of minor importance as a source of sales in the coming year.

#### Paperboard Industry

While there was a dip in the paperboard industry during part of 1953, it recovered rapidly and now has a favorable relationship with the balance of the non-durable goods industry. As you know, the bulk of the paperboard market lies in the non-durable goods field, and this seems to be fortunate insofar as the outlook for 1954 is concerned. As is often the case, components of production will show diverse movements and, while we read and hear discussed that total production will probably be off in 1954, production of consumers' non-durables is apt to remain relatively stable throughout most of next year. Production of consumers' perishable goods (manufactured foods, beverages, newsprint, etc.) is expected to show slight increases in the coming three quarters. Production of consumers' semi-durable goods (paper, textiles, rubber products, leather, etc.) will probably show some strength in the remainder of this year and then ease very gradually in 1954.

Not only do components of production show divergent movements, but there are divergent trends among the various end-use industries of any one category. This is the case in paper board, and so I will try in some of my remarks to split these industries and give you some information on each. I'll start by giving you some of the highlights of the 1953 season.

1. Total paperboard production in 1953 at an all time high will exceed 12 MM tons and should exceed 12½ MM.
2. Container board production will be 13-15% higher than in 1952.



3. Boxboard production also having its best year should be 12-14% over 1952.
4. Mill activity averaged 94% first 10 months, exceeded only twice previously—in 1947 was 99%.
5. Special food board in which Marathon Corporation is primarily interested has virtually doubled capacity and production since 1949; it is estimated that '53 production will be 1 MM tons or 98.5% of capacity. Production of milk carton board has expanded 50% since '50 and is now tapering off—over-the-counter stores field is now 90% in paperboard but the home market has barely been tapped.

I hope I haven't thrown too many figures at you, but I've tried to show you what has been accomplished in the past and now I'll stick my neck out for 1954.

As I mentioned before, consumers' non-durables won't vary much in total in 1954 but will have divergent movements within the groups making up the totals.

Demand for paperboard is expected to be maintained in 1954. But demand varies by customers within the industry. I'll try to explain. Marathon sells to food manufacturers who in turn sell to jobbers, food chains, etc., who ultimately sell to the end-use consumer. In the case of our products, the housewife will buy the doughnuts, the ice cream, the frozen spinach, and the old man will bring home the "bacon board." It is the end-use customer who eventually governs paperboard output. Next year we expect part of the nation's paperboard needs to be met from inventories of paperboard accumulated between the board producers and the packagers. The pipelines are all a little full, so that we do expect production to be down somewhat—down as a percent of capacity—but perhaps equal to this year's estimated output of probably 12½ MM tons. Capacity, you see, is expected to increase to 15,000 M tons compared with '53 capacity of 13,600 M tons—a 10% increase.

Demand for container board at the packager's level is expected to be down about 10% next year. At the ultimate consumer's level, however, container board demand is likely to remain steady. The steepness of the expected decline in total demand for container board by packagers reflects the importance of consumers' durable goods as a market for container board. Demand for container board is forecast to show the largest decline of the various grades of paperboard during the next 9 to 12 months.

Demand for folding box board is apt to fall about 6-9% next year. This decline, while relatively smaller than that indicated for container board, is larger than the decline expected for any other grade of paperboard.

During the first three quarters of '54 demand for setup boxboard is expected to remain steady. Production in '53 has been running in excess of

demand, indicating some increase in setup boxboard inventories in the distribution channels. By mid-'54 production is apt to be below criterion levels.

Special food board is the only segment of the industry expected to expand during '54. This year's production should reach 1 MM tons, about in line with demand. (And, as I mentioned before, 98.7% of capacity.) This amounts to about 19 M tons per week. In the first three quarters for next year, demand for special food board is likely to average about 20-22 M tons per week. That's a 10% increase. This increase will be primarily due to increases in the number of items packaged in special food board; only minor increases in the production of items that can be packaged by this board are expected.

#### Retail Trade

The retail markets were labeled as being dependent largely upon the activity of local industries in providing employment for "the purchasing public." In general, there appeared to be no reason to expect a sharp drop in general employment. Therefore, no sharp decrease in consumers' purchasing power was expected. It was recognized that the sales of semi-durable goods might be at a lower rate in 1954 than had been obtained in 1953 because inventories of "semi-durables" had accumulated. Therefore, it was expected that the "hard-line" sales during the first half year of 1953 might be "off" from 3% to 8%. Soft goods, on the other hand, have a market that is influenced by the expanding population. Since income of wage earners is expected to be higher than in 1953, it was expected that sales of soft goods would rise in 1954 in comparison to 1953—the sales volume of soft goods certainly would be as good as that obtained in 1953.

Over-all for the year it was expected that the department store sales would be in the neighborhood of 1% to 3% greater than they were in 1953. Retail stores were expected to be conservative in their buying, not to do advance buying, and possibly even to liquidate some inventory. It was not expected that inventories in retail stores would increase over present levels.

#### General Economic Factors<sup>1</sup>

##### Financial and Governmental Factors

Interest rates were not expected to increase in 1954. There was an indication that 1954 interest rates might even be a little lower than the present rates. It was expected that more mortgage money would be available for the housing industry and that it would be easier for small business to borrow in 1954.

It was expected that the interest rate would be manipulated to obtain a "favorable" rate that

<sup>1</sup> This section is taken from the paper presented by Mr. C. A. Koller of Allis-Chalmers Manufacturing Company.

would act to bolster the general level of business instead of acting as a "brake" upon general business as happened in the spring of 1953.

Although the amount of overtime might decrease in 1954, wage earners were expected to receive substantial incomes. In the past few years since World War II, the percentage of the national income that has been going into "savings" has been increasing from 4% to almost 6%. The current savings rate is in the neighborhood of 5.3%.

It was expected that there would be substantial savings in 1954. On the other hand, it was considered entirely possible that, with the lowering of the personal income tax rate, disposable income would continue to be at a high level. People also might decide to use some of their savings to purchase automobiles, or homes *if the general public believed that the situation was favorable to them.*

Elimination of the Excess Profits tax, which is expected to occur in 1954, is believed to be a favorable factor in continuing the high rate of business activity in 1954. Elimination of certain Excise taxes and the reduction of personal income taxes (as mentioned previously) were also believed to be favorable factors. In November, it was impossible to determine whether the Social Security tax would increase from  $1\frac{1}{2}\%$  to 2% as required by present law. It is believed, however, that should the 2% rate go into effect, other tax adjustments would be made to offset the increased taxation because of the change in the Social Security rates.

In the past, American business has been subject to governmental regulations and the application of governmental controls designed to control inflationary forces or to stimulate business recovery. It was doubted that 1954 will be a period characterized by more extensive use of "formal" government control measures. That is not to say, however, that some control over the business level will not be exercised indirectly. It was expected that 1954 will see further use of control of "the money market" as a means of forestalling serious recessions. This development undoubtedly will come through "management" of interest rates for government indebtedness, securing a higher limit for the national debt, buying and selling government securities by the Reserve banks in a manner designed to broaden the base on which banks grant credit.

Any drop in personal and business income will result in a decrease in government income since tax revenues will be less. The further expansion of the national debt will be an inflationary factor.

Tax relief, on the other hand, was expected to aid in maintaining the purchasing power of the country.

#### **Employment, Production and Earnings**

Employment at the present time is very near an all-time high and likewise unemployment is at a very low figure. It was believed that any readjustment in employment would be made first by eliminating the least efficient employees and perhaps the elimination of some married women who are employed at the present.

Elimination of the least efficient employees was believed to be a positive factor in reducing production costs. It was expected that the labor forces would not expand sharply during 1954 because the birth rate during the 30's was low and the recent increase in population is concentrated in the age groups that are still in school. Maximum of unemployment was not expected to rise above five and a half million persons—a low figure when compared to past experience.

The figure for gross national production reached a higher level in 1953 than had been forecast a year ago. It was expected that the gross national product figure will be lower for 1954 than 1953—about \$365 billion in comparison to its present figure of \$371 billion.

In the spring of 1953 the national production index reached 243 in March, and has now declined to 234. Projections are that this index will probably average out about 10% lower than the present activity rate, giving an average figure in the neighborhood of 215 for 1954, although at times during the year the index may go as low as 206.

Sales and earnings will vary extremely from industry to industry and also within industries. Since many companies are predicting increased sales and earnings for themselves (although they expect the trend for their industry to be downward), this situation undoubtedly reflects plans for aggressive sales policies and further emphasis upon cost control procedures. In general there appears to be no prospect for an over-all sharp dip or cut in production activity.

So, 1954 could very well be a good year. Even though it may be a very good year, there may be some companies that may move away from the general trend—either up or down.

The applications of the principles of flexible budgeting to different levels of operations may be a very useful tool in 1954 to preplan decisions prior to the necessity of making decisions compatible with the actual operating levels obtained.



## THE ECONOMY AHEAD—AN ECONOMETRIC APPROACH

By JACOB BAKER\*

### Nature of Econometrics

I thought that it might be useful, in spite of the fact that I know you are mainly concerned with our forecast of the economy ahead, if I took just a moment to tell you a little of how the econometric method operates. Our primary function is economic forecasting. There may be other kinds of economic analysis on occasion and at times, usually special studies for individual companies or individual organizations, but essentially our purpose is to forecast the major economic changes.

Forecasting, of course, has been done over the whole of recorded history. People have attempted to make estimates of what might happen. The ancients, in the time of the Romans and Greeks, had a variety of methods of forecasting that seemed to them very effective. Frequently the augurs were examined, the flights of birds, as to which way they were flying, or how many, or the entrails of an animal were examined as they were flung to the ground and that determined the future.

A good deal of forecasting rests on some of those traditions, but that is only to say that it is subjective. The more objective you can make it, with tested materials, the more effective it will be.

One of the ways of forecasting that has been used since economists became more numerous and voluble in the last one hundred years has been the examination of things gone by to establish trends, and then to extend those trends into the future. Over a period, any given period, trend forecasting will give right answers except for one crucial thing: the extension of the trend of car-loadings or of bank clearing-house amounts, or any other of the data of the business community, may be expected to continue until you come to a turning point, and then such trend analysis will always be wrong, 100 per cent wrong, because it will miss all turning points. The trend will be extended through the turning point either up or down. Consequently, you have got to find some other method.

The one that my colleagues in the Econometric Institute, and others who utilize dynamic or econometric analysis, use is to find data which offer a lead to the future, where a present decision or a recently made decision will cause something to happen as you look ahead. Well, the simplest thing and the largest body of material in our kit con-

sists of orders for goods—orders upon manufacturers. An order is a decision that has been made and that will be carried out.

Now, there are always cancellations of orders, of course, but you can take that into consideration; if you have a current report of orders less cancellations, you know at least what the backlog is. Orders result in production. In the case of some fields, such as textiles, it may be within a few weeks; in the case of capital goods, it may be as much as a year before the orders are actually worked out, or even more than that.

By accumulating orders, it is possible to forecast the level of production several months ahead. If you can forecast the levels of production, you then can establish the probability of industrial income. Then a forecast of farm income can be made based on the report of current and prospective crop yield. The other elements of income are functions of those two, so that they can be added and you get a forecast of national income.

National income can be forecast about nine or ten months ahead. We find that we can do it pretty accurately, extending it out about that far. Beyond that, of course, new elements may have developed or may develop in the course of ten months so it isn't very safe to go beyond a year.

The forecast of demand for capital goods, of course, is based on a different set of criteria, mainly and basically the relationship between capacity and the present or prospective level of requirement. If we are up close to capacity, it becomes obvious that we will need to build some more.

There are other elements, though, besides the simple relationship of capacity. There is the cost of money, the actual cost of installation, the prices of metal and metal products—a number of factors which have to be taken into consideration to determine the profitability of investment. Consequently, you can make a forecast of capital goods activity, six to eight months ahead. As an example of one of the changing factors there, the lowering of money costs last year resulted in a maintenance of capital goods orders at levels higher than they would otherwise have been and actually indicated a possible upturn in capital goods production in the next few months.

We also have to take into account the background or framework of the economy, international and national, of course. That is a little more difficult. It doesn't lend itself so easily or so directly to the technique of econometrics. We have to make assumptions based on the best information available.

\* An address presented at the National Conference, May 20-21, 1954, Hotel Penn-Sherwood, in Philadelphia. Mr. Baker is Vice President and Consultant in Management Planning of the Econometric Institute.

## Current Forecasting Factors

### Military Expenditures

And now coming to our forecasts for the year ahead based on these techniques (and I have merely presented them in a very sketchy fashion to indicate that every forecast that I am going to present has a background of specific analysis that came out with the result that I shall give you), first, as to our basic assumptions, our military and foreign aid expenditures are in decline and will probably continue to decline. We can assume, we have to assume, that the war situation will continue about as is, that is, that it will not expand into general war; on the other hand, it is perfectly clear that the Communist organization in the world is a permanently implacable antagonist of our kind of life and our civilization. Consequently, we can expect that they will keep up their attack. It may be by individual piecemeal attacks, first at one point on their periphery and then at another, or it may be, and probably will be, a continuation of subversion within areas somewhat different, for example, in Latin America.

The results of that situation seem to be that the American people accept the fact that we must maintain a very large military establishment, that we must proceed with the program of overseas bases that we have developed. We have already established a chain of strong points that run around the world, that give us direct retaliatory strength against any overt extension of the Communist area. If you look at the map, beginning with Greenland and coming down through the Atlantic and across North Africa and over to Okinawa, you can see those strong points. We are building another chain of bases now in Spain and France and Northern Italy and Greece and Turkey and Northern Pakistan, so that on our military expenditure we cannot expect it to evaporate or to drop very sharply.

Last year the total of military and foreign aid was about 52 billion dollars. This year our estimate is about 47 billion. Next year with the aeronautics program somewhat completed, although not fully, it will probably drop. The naval requirements are being deferred until there is full test of the atomic submarine, although we are continuing with the building of aircraft carriers and some nonmagnetic minesweepers.

One element of our military expenditure remains level, namely, the production of field equipment for the infantry of our Asiatic allies. That hasn't been given wide publicity (it is not secret), but we have undertaken, because there are no other facilities available, the full supply of the kinds of equipment used by infantry for Japan, 500,000 men within a little while, a year and a half; the South Koreans, the National Chinese, about 750,000 each; the Indo-Chinese, the French expect to build a native army there of about four or five hundred thousand; and the Philippines Army of somewhat over 200,000; and we recently took on another customer, Pakistan, with an army

of about 300,000 men and to be added to, probably taking it up to five or six hundred thousand.

You can see that we have a responsibility there for equipping a total infantry force of over three million men, so that that program of small arms production, mainly through the arsenals of the United States by assembly of components made by individual contractors (and it includes, as I say, the ordinary equipment of the infantry) will continue at about the present level through this and next year.

The ordnance program is very low at the present time, having been drawn down from a total rate of about 7 or 8 billion dollars eighteen months ago to practically nothing. In the event of outbreak or expansion of warfare in Southeast Asia, our ordnance program would immediately rise. That would probably give us a decline in our total of military expenditure from the present 47 billion to perhaps 42 billion next year, and somewhat under 40 billion in 1956, and running on for an uncertain period at somewhere between 30 and 35 billion.

Roughly, one billion dollars on military expenditure results in production of about two-thirds of a point on the Federal Reserve Board Index, so that a decline of 15 billion dollars in military expenditures reduces the Federal Reserve Board Index of Industrial Production by about ten points in the course of about three years.

### Monetary and Tax Policy

There are some other background or elemental framework structures that have to be taken into account. One is our monetary policy. That is of prime importance. We for the first time have now both the knowledge and the facility so that a money supply may be maintained to meet the full requirements of the nation. That money supply has to grow every year. Our population is growing at the rate of 1.5 per cent, our per capita consumption is growing at the rate of  $\frac{3}{4}$  of 1 per cent so you have pretty close to 2.5 or 3 per cent increase in the need for money to cover the inventory and other requirements.

The Federal Reserve Board has full authority, based upon the legislation of the thirties, to maintain that money supply. They can raise or lower reserve requirements of banks; they can raise or lower the re-discount rate, and they can continually operate in the open market, buy notes and bills and bonds and thus supply more money to the banks; or they can refrain from that and thus dry up the banks. Unfortunately at this moment—and this is a kind of critical problem and does affect the forecasts—the Federal Reserve Board, for some reason, apparently in antagonism to the Administration generally, has been reducing the money supply.<sup>1</sup> In the past four months they have reduced the money supply by about one billion dollars by simply allowing their notes and bills to

<sup>1</sup> Note the date of this presentation, May 1954. After new appointments to the Board an easier policy developed with gradual reduction of reserve requirements.



run off and not replacing them. Consequently, there is some question as to whether or not we actually shall have the wisdom on the part of the Federal Reserve Board to avoid the situation that developed in the summer of 1931.

At that time, the cyclical recession had ended and there was a possibility of our going into a period of expansion. Unfortunately, the money supply was tightened instead of loosened; instead of being eased, interest rates were raised, and the result was that we actually went off into that spiral of depression that fed on itself through a complete and compulsory liquidation of inventories that brought us to the bottom in 1932 and '33.

The other policies of government that are important are the Treasury policies with regard to interest rate. That seems now to be about level. We think that interest rates will continue at about the present levels through the next year, the Treasury having decided against the hard money policy that they entered upon with some enthusiasm in the spring of 1953 and came a cropper on, with the tightening of bank credit in May of last year. The Treasury was extricated from the difficulty by the Federal Reserve Board beginning open market purchases, and also reducing the reserve requirements of the banks.

The new Administration also has set up some other methods of benefit to the business community which we think will be carried out. The bills are in the Congress now, having both of them passed the House. One is the omnibus tax bill which has many useful provisions in it that will stimulate investment, but one particularly that will stimulate it, and almost immediately, is the provision giving the investor considerable option of choice as to the rate of depreciation, so that within five years he can get a tax credit that will amount to somewhere around 30 per cent of his investment. The effect of that will be to stimulate not the expansion of capacity—we have about enough capacity—but rather to stimulate the dismantling of old and inefficient capacity and actually replace it with more efficient operations. That will expand capacity, naturally, to some degree but not much more than our population growth will warrant.

#### **Population and Housing**

On the matter of population, I might say that we can expect the present rate of growth to continue for some time, certainly for the next ten years and possibly more, and beginning in 1956 the rate of family formation will rise on the biologic base of the birth rate of the thirties. The low point of the birth rate of the thirties was in 1933; in '34 and from '35 on the birth rate rose and, consequently, there are more marriageable people becoming available for establishing families from 1956 forward.

This year we are getting a little bit of extra stimulus to family formation because of the reduction of our military forces. Standing as they did at 3,800,000 last summer, now down to about

3,600,000 and expected to be within 3,400,000 within four months, that gives us a considerable addition to the marriage rate that we otherwise would not have had. It is a special situation.

Another one of the Administration's programs that fits into this general problem of family formation relates to housing. The housing bill has a considerable number of provisions, most of which are not greatly important to the economy, although they have been widely discussed, particularly the provision on public housing; but the important provision in that bill is the one which extends to the general public the conditions of credit that heretofore have been available to veterans. There is a limitation, and perhaps it is too low a limitation, of \$10,000 per unit, but builders see the way to meet that by separating out the heavy appliances and perhaps even the heating equipment and setting up a separate lease purchase arrangement for that, and thus getting the total value under the \$10,000 limit.

The effect of that, since it provides for government guarantee, long amortization and lowered interest rates, will be to increase the rate of housing above the level that it otherwise would be. We would have fallen by this time to a rate of starts of perhaps nine hundred thousand a year. Actually, the starts thus far this year are pretty close to an annual rate of one million one hundred thousand, which is what they were last year, and that is because of the fact that a good many builders across the country are anticipating the passage of that bill, which applies to all starts made since January 1st, and consequently the probability is that housing starts this year will be at or around one million, although family formation will be down at about 900,000 this year as against 950,000 last year. That is net gain of families; family formations, of course, is up around 1,600,000, but we have, through death and the amalgamation of some families, with old people going to live with young people and so on, a reduction of families by about three-quarters of a million or a little less than that, so it gives us a net gain of families this year of close to 900,000.

#### **The 1954 Outlook**

##### **Capital-Goods and Consumer-Goods**

As to our specific forecast, without much detail as to the reasoning (because I am conscious of our time arrangements) the capital goods production of the country this year will be off by about 6 per cent from last year, but sometime in the next two or three months, with this provision of optional depreciation becoming effective, with interest rates remaining some 20 per cent lower than they were a year ago (I don't mean 20 per cent as to the interest rate but as a fraction of the rate then, down to 2.8 on AA corporates now as against 3.35 last summer), if that continues we probably shall have a rise in capital goods orders and production in the course of the next three months, not a great rise, not bringing us back to

last year's level, but at any rate showing an improvement in the situation.

That, of course, will have its effect over a great many industries because it immediately creates the situation of probable requirement, increased requirement as to steel and as to revenue ton miles for the railroads.

Durable consumer goods,—which include everything from kitchen utensils to automobiles, and the largest component of which is automobiles, about 37 per cent of the whole—are off very sharply from the production of last spring, down about 15 per cent. There, one of the important elements is price. The probability is that prices will continue to give in heavy appliances and in automobiles. In automobiles, prices have given a good deal already by reason of dealers' concessions. The manufacturers have made no concessions thus far. One or two of the independents, I believe, have, without much announcement, enlarged the discount to their dealers, thus enabling the dealer to make a little better concession.

The total production of automobiles last year was 6,100,000. The basic total this year, at present prices, would be about 4,700,000 (I won't go into the details of how that is arrived at but it is by our basic techniques), but in addition, there are 200,000 sold abroad and also the companies intend to load the dealers with another 200,000 as they did last year. They liked the situation that existed in 1939 and '40, when all dealers, on the average, had fifteen cars. They started this year with eleven cars each. That pressure of added cars—they put another 200,000 on—would make it 5,100,000 as to production, and that pressure is, of course, even now causing concessions to be made. If the total of concessions by manufacturers and companies amounted to as much as 15 per cent in price, the added number of cars sold would be about 9 per cent, so that the forecast of the automobile industry would at this moment be somewhere between 5,100,000 and 5,400,000 or 5,500,000 this year.

Similar situations exist in most of the heavy appliances. But because of the fact that the curtailment has been so great and that the price concessions are in process of being made, the probability is that we will have an upward turn, again a small one of two or three per cent only, in consumer durable goods in the second half of the year.

As to the nondurable goods, textiles, apparel, paper and paper products, foods, drugs, shoes and leather products, all of those taken together, the probability is continued improvement of production and demand. Orders in that field have been above production for the last eight months. Inventories are trimmed and, consequently, we can expect that there will be firmness in the textile industry and the paper and paper products industry, food and drugs, through the rest of this year.

## Construction

The situation as to construction materials is one of a relatively trim inventory because of the fact that people anticipated substantial reduction of construction this year. The housing legislation, of which I have spoken, has resulted in lifting the rate of housing starts—the anticipation of that legislation. The general pressure for municipal public works has continued. The total of state, county and municipal works, all kinds of public works, last year was about 6.5 billion, the largest component being highways at 3.5 billion dollars. This year highways will rise to four billion dollars and the total will rise from last year's 6.5 billion to 7.5 or something of that sort.

Commercial construction, warehouses, office buildings, department stores, shopping centers will be at last year's level close to 3 billion dollars. There is no good way of forecasting that, by the way. We are dependent upon an estimate that is made on contracts and permits and statement of projects, and so forth, but there are many areas of the United States, many cities that have not had much construction. New York has had a great deal, Chicago very little. Pittsburgh a lot, Philadelphia not very much, and so it runs across the country. There are enough cities and areas that require added office and other kinds of space so that that will probably continue at last year's level through the whole of this year and into next year.

Well, the sum of it all is, as to all construction, taking public utility, railroad and industrial construction, about the same as last year. Industrial construction, by the way, will also be affected by the tax bill. It has run down for the last two years because of the completion of a good deal of capital equipment and if the optional depreciation arrangement becomes effective, it will, and, as a matter of fact, has already shown some response because the Administration found that they could considerably expand the application of certificates of necessity. They issued a statement of that in February, and the applications and the certificates issued have been running somewhere around at a level of ten or fifteen million dollars monthly and they rose in March to one hundred million and I believe the April report will show further rise.

The total of all construction, taken together, will be about the same as last year, 34.5 billion to 35 billion dollars. Because construction materials are in trim supply, it means probably an increase in the production of all construction materials in the course of the second half of the year. Of all construction materials taken together, the only one that still has some lumps of inventory is steel but there, construction steel is not actually in excessive inventory because, as you know, it is pretty much a custom-made job.

## Production and Income

The summarization of this whole thing can best be stated in the Federal Reserve Board Index of Industrial Production. Taking the new index that came into use on January 1st, established by the



Federal Reserve Board, using 1947-49 as 100, that index last year ranged from a low at the beginning of the year of about 132 up to 142 in May and July, and then dropped off to a low of 128 at the end of the year. The average for 1953 was about 135. The index has continued down this year to a present level of about 122 which is our estimate for this week. It will probably continue down to 120, and then, as I have pointed out, the probability of improvement in all of the segments of industrial production in the second half of the year will carry the index back to a figure of about 128 at the end of the year. It would go on into next year at that level.

For 1955 the index will probably continue at about the 1954 year-end level, averaging about 128, but not getting back to the 1953 level. It will not be until 1956 or '57 that pressure of population and family formation will create such demand that we will go on into a longer continued expansion. It then seems pretty sure that, from the latter part of the fifties, that is, from '56 or '57, we will almost certainly have a long period, perhaps as much as a fifteen-year period of expansion, with some interruptions.

The situation as to income this year is a little better than industrial production. Farm income is apt to be up 3 per cent from last year because of the current situation as to crops and prices. Industrial income will be down, of course, because of the declines in hours worked and the rise in industrial unemployment. However, there has been practically no decline in the total of employment. The rise in unemployment has given a false impression that there has been a decline in employment. Actually, we are adding people to the services and trades, not rapidly, but we are adding them almost at a rate sufficient to equalize the decline in industrial employment. So our total of income this year, taking into account the tax reduction—this is income after taxes, disposable income—will be 249 as against 248 last year. The pattern of income will be relatively stable, 2 per cent up in the first quarter, about 1 per cent off

in this quarter, off a further 1 per cent in the third quarter, and then up again 1 or 2 per cent in the fourth quarter, giving you a pretty good Christmas season as far as retail trade is concerned, the only weakness being in the consumer durable goods because of the saturation or the near saturation of the market by reason of high home inventory.

On this basis of production and income, interest rates will remain level. Prices will remain level through this year. The cost of living is apt to decline a little because rentals are beginning to show a slight decline, and that is also true of some of the services, not much. The present level of the cost-of-living figure, the Consumers' Price Index, is about 114.5 and it is apt to be about 113 at the end of the year. That would tend to lessen the pressure for wages a little, but of course we have strong organization and then there is a general habit, both on the part of industry and of organized labor, of having an increase of wages annually or every other year or so, so the probability is that wages will rise this year about 2.5 per cent as to rate—wages and salaries—as against 3.5 last year and 6.5 in the last year of the Truman Administration.

That is the total situation at this moment. A probable rise in both industrial production and in income through the latter half of the year, farm income up a little bit, not enough to change the situation as to the demand for agricultural equipment because the farmers are somewhat oversupplied, but enough to maintain an even higher market for fertilizer and for fuel used by farmers. You can carry the implications of this forecast to various industries. If you have a rise in industrial production it, of course, will mean there will be increased demand for fuel and we will continue to have the shouldering aside of coal by gas and petroleum, so that the gas and petroleum industries are in better situation than coal. You can carry the implications of this kind of forecast to any industries in which you are particularly interested.

## OPERATIONS RESEARCH AS AN AID IN PLANNING

By ARTHUR BROWN\*

### Nature of Operations Research

The common characteristic of operations research work is probably best described in terms of the kind of people in an operations research group. The wartime leaders of operations research, in England and the United States, were Patrick Blackett, a nuclear physicist and a recent Nobel Prize winner for his work in physics and

cosmic rays, C. H. Waddington, a geneticist from Scotland whose peacetime occupation is breeding better cows for the British Isles, Philip Morse, a nuclear and a cosmic physicist at M.I.T., George Kimball, a Professor of Physical Chemistry now at Columbia University, and the man under whom I first trained when I was at Bamberger's, Horace Levinson. Levinson was by training a relativity theorist. He had written a thesis for the University of Chicago on Einstein's relativity theory and has continued his work along these lines, along with his professional activities in operations research.

\* Abstracted from an address presented at the National Conference, May 20-24, 1954 at the Hotel Penn-Sherwood in Philadelphia. Dr. Brown is a member of the Operations Research Staff of Arthur D. Little.

I am, myself, a mathematician by training. Most of the other people that I know in operations research are trained either in mathematics or in research physics or chemistry.

It is the importation of these people into studies of operating organizations that I think constitutes the really new thing about operations research. Of course, not all the people now doing it by any means are intellectual equals with the pioneers in the field. I think we have only, as I say, one Nobel Prize winner in operations research. What the future will bring, who knows? An operations research group, then, is a collection of scientists who are set up at a central position in an organization. Blackett sat in at wartime cabinet meetings and took part in the daily activities of Naval Headquarters in England. Waddington was attached to the Commanding Officer of the Coastal Command which was that arm of the British Air Force which was working against submarines. Dr. Morse had his headquarters in the Office of the Commander in Chief of the U. S. Fleet. Levinson, at the time that I worked with him, was also the treasurer of the organization for which he was doing research.

As a firm of consultants, Arthur D. Little's operations research group works more on particular problems for an organization than it does on company-wide activities, but organizations which have brought us in have found it useful to set up fairly broad connections even on these particular problems.

The group is not only set up at a central spot but it is free to investigate across organizational boundaries. The military operations group, for example, in the Navy had separate components which investigated air, surface, submarine, amphibious warfare, and they had representatives on the staffs of all of the major theatre commanders. This cross-connection is a valuable part of the work. What you find out in one place frequently has a close bearing on operations which are apparently somewhat distinctive. In industrial groups, in those companies which we know of which have set up their own operations research group, there is also freedom to cut across the boundaries between sales, production and general management.

Operations research is really research. The basic job of any group is to get to understand the workings of the organization, to come up with mathematical and conceptual descriptions of it which can be used in furthering that understanding and which can be used to yield numerical estimates of productivity and of the needs for resources. These estimates can be used in helping the planning, and in deciding whether or not to make manufacturing changes.

### Examples of Applications

How does an operations research group work? At this point I think perhaps an example might help. I am going to have to paraphrase some of the work that we have done; for reasons of commercial confidence we can't describe the compa-

nies that we have worked for. The difficulty with the paraphrase is that sometimes the illustrations are a little bit strained. I hope you will bear with me on that.

One of the principal techniques of operations research is what we call theoretical model building. This means that you work out a fairly simple, simplified and somewhat inaccurate picture of the company's operations. You sacrifice complete accuracy in detail and you gain, in return, the ability to manipulate the equations, to make forecasts quickly and modify them quickly.

Some of the cases on which we have worked (I take these as typical examples of operations research work) are as follows:

### Selection of Accounts for Promotion

A specialty-products manufacturer serviced a large number of accounts through the use of salesmen. The operations research group recognized that the key to evaluating these salesmen's work lay in finding a simple but realistic idea of the way customers behave. Examination of the record—that is, the research group went back to the records of purchasers of individual dealers—showed that customer behavior could be accurately described by what we defined as a time-dependent Poisson process. This is a bit of jargon but I am stuck with it. It is a type of process which is widely found in nature, from problems in biology to problems in nuclear physics. This concept yielded the key to establishing precise measurements of the efficiency of the salesman's work.

You see, if you know how the customers behave naturally when they are not promoted by the salesmen, and then if you find out how a group of customers behaves as a statistical unit when the salesmen are at work on them, you can determine how efficient the salesmen are in changing the natural state of the customer.

The most significant effect was the construction of a new method of directing the promotional salesmen to the appropriate accounts. Careful experiments showed this new method yielded annual increases in sales in the million-dollar bracket, with correspondingly large increases in net profits.

### Evaluation of Trade Advertising

A manufacturer of chemical products, with a wide and varied line, sought more rational or logical bases than the customary percentage of sales for distributing his limited advertising budget among products. Some of the products were growing, some were stable and others were declining.

### The Relation of Selling Costs to Profits

A processor of a line of food products supported his distribution effort to retail grocery stores by promotional or missionary salesmen. The executive board questioned the amount of promotional effort which could be justified. Studies were made which yielded explicit mathe-



mathematical statements of the relation between the number of accounts called on and resulting sales volume, and the relation between sales and manufacturing and distributing costs. These were combined by the methods of differential calculus to set up simple tables for picking the level of promotion in each area which would maximize company net profits. The results showed that nearly a 50-per-cent increase in promotional activity was economically feasible and would yield substantial profits. We succeeded in adding 50 per cent to the sales force, to that part of the sales force which is engaged in promoting.

#### **Establishment of an Equitable Bonus System**

Certain operations of a manufacturer of electrical equipment employ large units of complex semiautomatic machines with several such machines tended by a single operator. A series of industrial engineering studies had been unsuccessful in locating and eliminating the causes of dissatisfaction of employees, as well as the company, with existing bonus systems on this type of operation. An operations research study yielded a mathematical formulation or description of the operation, based on an extension of the simple "waiting line" theory used, for example, in the telephone industry. This is the theory by which the American Telephone and Telegraph Company decides what switchboard capacity it needs now to handle given volumes of traffic, and by which they can regulate the amount of capacity they will need in the future. This formulation showed how product characteristics, labor efficiency, and machine characteristics affect output, and how the operator can influence the results in widely different ways, depending upon the incentive plan in force. The operations research study group did not produce a new incentive plan, but it did find a basis on which the company could construct a rational and satisfactory plan.

#### **Establishment of Sound Inventory Policies**

A supplier of valves, bearings, and other mechanical components producing many thousands of items, required sound inventory policies in the face of violent changes in demand and changing design and style conditions. We are talking here about the establishment of working inventories and not inventory management in the larger economic sense. The company wanted answers to the questions of what to produce, what size and type inventory to maintain, and how rapidly to adjust production operations to meet changes in the level or mix of demand.

A team of physical scientists with no prior experience in the industry was able to show that the inventory control systems had to obey the same fundamental rules as electronic control equipment. Application of methods analogous to those used in electrical engineering led to development of improved control and reordering methods.

While superficially, each case is rather different from the next, it has been possible to find fundamental similarities on which a theory of inventory

control and production scheduling can be built. The final formulation of such a theory should go far toward clarifying problems of control of working inventories and helping business executives in framing sound inventory and production policies.

#### **Studies in Plant Location**

A company with a number of products made at three different locations was concerned with the items to be produced at each and the points at which the items should be warehoused. Freight costs constituted a substantial part of the delivered cost of the material. The operations research group showed that what appeared to be a complex and involved problem could be broken into a series of rather simple components. Some adaptations of linear programming methods were used to find the warehousing schedule which would minimize freight costs.

#### **A Study in Equipment Design**

A manufacturer of industrial control equipment wanted an evaluation of a new method of controlling railroad operations, in order to determine whether the product would be salable if developed. The proposed control system under development would cost somewhat more than existing systems but would presumably improve railway operations by increasing the amount of information available to the train operator or engineer. A mathematical model of railroad operations was set up to express the delays suffered by the railway operation as they were affected by the fundamental time characteristics of the control system. This model, set up in advance of actual construction of the system, showed that improved operation of the control alone could not measurably affect the delays suffered by the railroad because existing operating rules would not allow the extra information to be taken advantage of. This provided a basis for the conclusion that unless railroad operating rules could be changed, the proposed system would provide no substantial improvement in road operation and would represent a complete loss in development funds. The development was shifted toward the construction of a system which would provide equivalent service at lower cost.

#### **Establishment of Operating Standards**

An industrial products manufacturer found that operations research methods provided an extension of normal industrial engineering methods in the area of setting time standards as the basis for cost and labor efficiency control. In several complex operations, the group set up mathematical equations which related to the physical characteristics of the products and the equipment and to the time required to produce a given amount of output. These equations could then be used, with only limited time study or special data collection, to set up tables of production time standards based on product characteristics, equipment used and worker efficiency. There are a couple

of more examples relating to production scheduling methods and the estimation of the size, value, and cost of clerical tasks.

### Relation to Planning and Budgeting

How does operations research tie in with planning and budgeting operations? Fundamentally, the operations research group is set up to work on operating and not on planning problems, but in the course of construction of simplified mathematical description of the business, they come up with very valuable by-products which can be used in planning and budgeting operations.

It seems to me that the word "planning" can be taken in two senses: first, in the sense of long-range thinking comparable to the sort of military estimate which a military staff goes through: What are our basic objectives? What am I trying to do, and why? What policies restrict my courses of action? What assistance can I count on? What are my own resources? What can I do with these resources? What is the opposition? How strong is it? What are its objectives?

If I take a given course of action, what risk do I run and what will the opposition do?

Having gone through this general line of thinking, one asks: How much force do I need to carry this out?

And here we come to budgeting. If I intend to increase my sales by 10 per cent, how much sales effort do I need? How much extra manufacturing effort? How much money must I put into financing inventories, and so on?

Having allocated these forces, the planning and budgeting group sets up authorizations and makes appropriations which must be passed on to people down the line who are going to apply these forces. They lay out timetables and they must provide for flexibility. Once the plan is in operation, since the future is never so nice as to conform exactly to our forecasts, we have to make provision for either saving money if our required effort is less than we thought, or for putting in more money in case our sales or production load increases. This means that we have to watch our performance, measure it against the budget and provide for budget amendments either upward or downward.

How can operations research assist in this process? In the preliminary stage, while the general plan is being laid out, the use of industrial models, organizational models, high-speed computing machinery, and so on, can help to reduce the complexities of the general situation facing the planners and can provide for rapid evaluation of alternative plans.

In the general planning stage, it can help to estimate requirements; it can help to evaluate the effects of chance fluctuations and errors in forecast, and it can help to set up ideal or goal performances which would be used to check actual performance against.

In the budgeting stage, I believe the operations research group can help by measuring costs, and by helping to separate fixed and variable costs as derived by measurements of actual operations rather than by allocation of accounts. In the control stage it can be of assistance in preparing rapid, usable operating reports by making sample studies and spot surveys of the performance of the organization, by studies of variance of performance against the plan and by competent evaluation of operating changes.

I would say, in conclusion, that an operations research group is a staff research group whose main job is to assist the executive. It should be available to the operating head of the organization. Its normal duties are concerned with operating problems, operating decisions, but it can serve a valuable role in assisting planning and budgeting functions.

\* \* \*

### References recommended by Dr. Brown:

1. C. C. Hermann and John Magee, *Operations Research for Management*—Harvard Business Review, July–August, 1953.
2. Philip Morse, *Operations Research*, Technology Review, Massachusetts Institute of Technology, May, 1953.

Hermann and Magee, members of the Arthur D. Little staff, deal with applications of operations research to business, while Professor Morse of M.I.T. deals with the scientific aspects of the subject.





## **PART III**

### **BUDGETING FOR NON-PRODUCTION DEPARTMENTS**

- 1. Advertising**
- 2. Engineering and Research**

PART II

CONSTITUTIONAL DEPARTMENTS

CHAPTER I

OF THE EXECUTIVE DEPARTMENT



# 1. ADVERTISING

## HOW MUCH SHOULD YOU SPEND FOR ADVERTISING?

By JOEL DEAN\*

### The Problem

This paper suggests a new approach (blushingly labeled *Profitometrics*) to the old, old problem of determining how large the advertising appropriation should be. This problem, like others, can be solved by an intuitive and perhaps artistic process. Alternatively, the solution can come through a formal and systematic study of objective evidence. Quite possibly men of experience and good judgment can handle the advertising problem quite effectively by intuitive and subjective means. Even though this be granted, this paper shall be limited to a consideration of the ways in which systematic quantitative study can suggest the appropriate size of the advertising appropriation. This limitation in the scope of the paper is not dictated by any necessary superiority of the objective process—although the process would seem to be better than any other in a field in which unsupported faith and myth are so prevalent—but because discussion can never be very useful to the intuitive process, while it can indicate the most promising lines for objective inquiry.

Advertising expenditures, like all business decisions and all other expenditures, should be judged in terms of their effect on the objectives of the company. Most companies have several objectives. All are motivated by the desire for profit; some, by a desire to grow or to expand their market share; others, by a quest for security, etc. The ideal basis for the exercise of judgment regarding the size of the advertising budget would be a measurement of the effects of advertising on the success of the company in achieving all of its objectives. For the purpose of simple exposition, this paper shall be restricted to a consideration of the measurement of the effect of advertising expenditures on profit, although many of the methods suggested would be equally appropriate for the determination of the effect of advertising on other things—market share, for example.

\* Published in Technical Notes, Vol. II, No. 4, January 1954, previously presented in somewhat different form before the New York Chapter. Dr. Dean is head of the consulting firm, Joel Dean Associates, and Professor of Business Economics at Columbia University.

Dr. Dean wishes to acknowledge the joint authorship of James Lorie, and the assistance in preparing this paper and the exhibits of Dr. Gordon Shillinglaw, both of Joel Dean Associates.

### The Profitometrics Approach

The basic tenet of the Profitometrics Approach to decisions on advertising outlay is simple common sense: that advertising expenditures are justified to the extent that they cause increases in sales which add enough to corporate profits to warrant the outlay. In order to use this approach we must make four separate measurements: (1) the effect of advertising on sales, (2) the effect of sales on profits, (3) the loyalty-life expectancy or longevity of customers, and (4) the rate-of-return on rival investment opportunities.

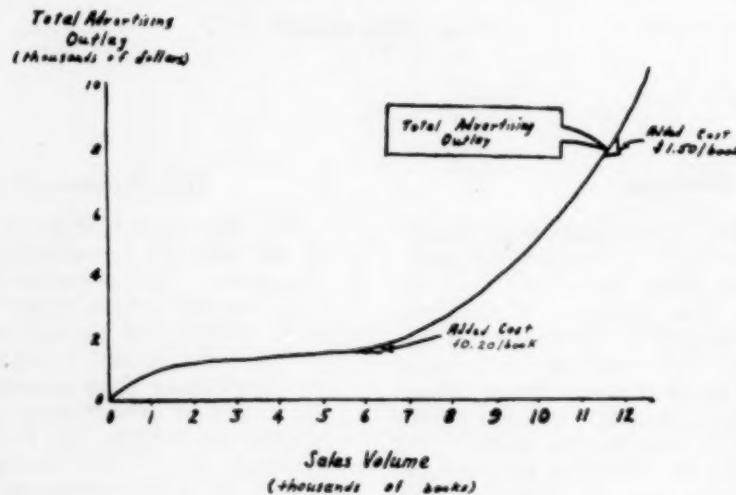
To illustrate these ideas in simple terms, we have three charts relating to direct-mail sale of a book. In our example, we have assumed that the price will remain the same at all rates of sale which are considered, and, further, that the added cost of production and physical distribution per copy—which we call the incremental production cost—will also be the same. These assumptions are realistic for a surprisingly wide range of commodities.

Exhibit 1 shows the kind of relationship which it is reasonable to believe exists between advertising and sales and which in fact has been found to exist when measurements have actually been made. You will observe that the increase in sales which is attributable to advertising becomes less and less as more and more advertising is used. That is, the increase in sales which results from spending \$9,000 on advertising rather than \$8,000 is less than the increase in sales attributed to the expenditure of \$2,000 rather than \$1,000. This conforms to common sense in that it indicates that initial advertising attracts the most susceptible customers and that subsequent advertising must be more and more intense to induce the less susceptible to become customers.

As an example, consider the response to successive mailings of advertisements for the book. The initial mailing will bring in the customers whose natural passion for the opus is greatest while subsequent and more intense persuasion may be required to induce recipients of other mailings to become customers. As a result, the added advertising outlays required to sell one more copy increases from 20¢ per copy to \$1.50, in our example. (The curve in Exhibit 1 traces total costs. The slope of this curve, that is the rate of climb, indicates added cost of selling one

# EXHIBIT 1

## EFFECT OF ADVERTISING ON SALES



ADVERTISING COST CURVE BECOMES STEEPER  
AS MARKET SATURATION IS APPROACHED.

more book.) The same form of relationship is found when single mailings are made to lists that differ in susceptibility.

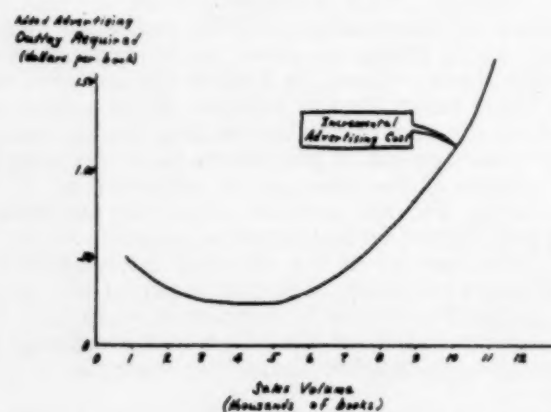
Exhibit 2 shows the same basic relationship restated in terms of the added advertising outlay required to produce added units of sale—a relationship that might be called the incremental advertising cost curve.

The next measurement that the Profitometrics Approach requires is the relationship between sales and profits. Exhibit 3 shows the relationship which follows from our assumptions that the price and incremental production costs remain the same over the range of variation in sales that it seems relevant to consider. Because price stays the same and incremental production cost is constant, the incremental profit remains constant. That is, leaving advertising costs aside for the moment, each additional book that is sold results in a constant increase in profits—\$1.50 in our example.

You can now combine the two measurements in order to see what the size of the advertising budget should be. In Exhibit 4 we superimpose the line representing the relationship between advertising and sales on the chart representing the relationship between sales and profit. We can see that advertising beyond the intersection of these two lines results in an absolute reduction in profits. That is, the advertising cost of acquiring

# EXHIBIT 2

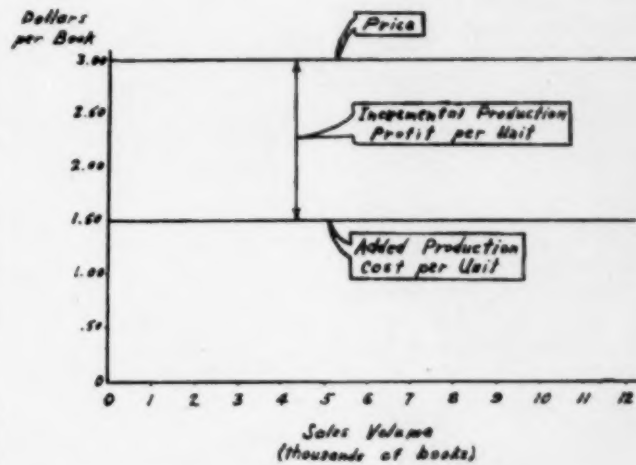
## ADDED ADVERTISING COST NECESSARY TO MAKE AN ADDED SALE



THE AMOUNT OF ADVERTISING NECESSARY TO INDUCE THE SALE OF AN ADDITIONAL BOOK FIRST FALLS SLIGHTLY, IS CONSTANT OVER A CERTAIN RANGE, AND THEN RISES RAPIDLY AS MARKET SATURATION IS APPROACHED.

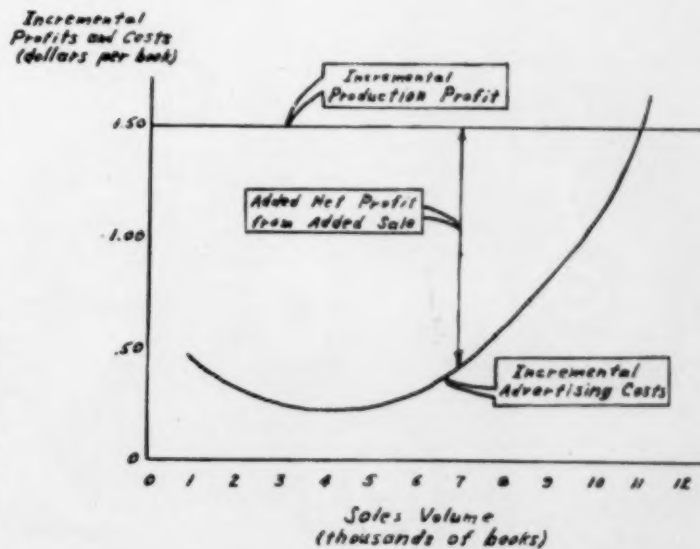
### EXHIBIT 3

#### EFFECT OF SALES ON PROFITS



### EXHIBIT 4

#### EFFECT OF ADVERTISING ON PROFITS





customers exceeds the additions to profits which those customers create. Beyond the point of intersection it costs more than \$1.50 to increase sales by one book whereas the increase in sales by one book adds only \$1.50 to our profits.

This kind of an approach to decisions on how much to spend on advertising has very seldom been used, either because it is misunderstood, mistrusted or felt to be impossible to apply. Before examining the validity of these reasons for not using it, we shall first consider alternative ways of determining the total advertising appropriation to see what they have to offer.

### **Alternative Approaches**

#### **The Percentage-of-Sales Approach**

Determination of the advertising budget as a percentage of past or expected sales is a method which is quite widely used. The method has several variants, but all determine advertising appropriations as a fixed or systematically varied percentage of past or expected sales. This approach is difficult to defend. The problem of advertising is to increase sales, and it seems appropriate therefore to view advertising as their cause rather than as their result. The amount that should be spent in increasing sales depends on the worth or profitability of the increase, and the volume of sales that the company already has tells nothing about the profitability of getting more.

How can we explain the widespread use of this method? To some extent it may be because of management's desire for certainty and the illusion of control which arises from relating a large discretionary element of expenditure in a systematic way to revenue. There is a comforting element of safety in a process which relates advertising to revenues, since expenditures are thereby timed to come when the company has the gross revenue to afford them and when their tax effect may be expected to be favorable. It should be pointed out, however, in this connection that this element of safety could be increased by making advertising depend on expected profit rather than expected revenue.

Another possible explanation for the popularity of this method stems from the competitive structure in the industry of many large advertisers. If all, or most, members of an industry use this method and employ the same percentage of sales, advertising outlays would be roughly proportional to market sales. Thus some limit would be set to competitive warfare through advertising.

Thus, although the percentage of sales approach appears on the surface to have no logical justification, it has attractive features. It provides a formula which creates an illusion of control; it creates a rough adjustment of outlays to the ability to pay; and it provides some order in the competitive structure. Nevertheless inertia and the lack of understanding of more logical and definitive methods of analysis are probably the most

important explanations for the popularity of this mechanistic approach.

#### **The "All You Can Afford" Approach**

An approach to the determination of the advertising budget that seems to be more widely used than is publicly admitted involves establishing the advertising budget as a pre-determined share of profits or of liquid resources.

At first glance this method seems to make no sense at all, yet such an approach does take account of the very important effects imposed by the level of profits and liquidity in setting the outer limits of advertising expenditures. Setting such benchmarks is worthwhile even though it still leaves a tremendous amount of discretion to management in setting its advertising budget. That is, although the firm's resources set an outside limit on advertising outlay, this extreme limit may be and often is well above the limit which would be dictated by a strict and competent regard for profits.

Corporate income taxes favor concentration of advertising at cyclical peaks and penalize attempts to accumulate advertising reserves to be spent in depressions. One reason is that tax rates in the future are quite likely to be higher in prosperities than in depressions and the carry-back and carry-forth provisions of the law are probably inadequate to remove this tax incentive for bunching expenditures. Moreover, Section 102 discourages retention of earnings for advertising during future depressions. Furthermore, some companies because of union negotiations or public opinion seem to be embarrassed to show very high cyclical peaks in profits and may choose the cyclical variation in advertising expenditures as a means for adjusting profits to the apparent dictates of these forces.

Used uncritically, the all-you-can-afford method is undesirable largely because there is no fixed relationship between liquidity and the richness of advertising opportunities. If another \$1,000 of advertising will bring \$2,000 of added profits, it is hard to say that the expenditure cannot be afforded. A management that limits advertising to percentages of liquid funds or profits may forego highly profitable opportunities for advertising. Similarly, spending a fixed percentage of resources or profits may involve expenditures which go far beyond the point at which the added earnings from advertising equal their cost. Spending money because you have it and without regard to its benefits is not often a defensible way of determining the budget.

The all-you-can-afford method, like other methods, has advantages and deficiencies. It produces a fairly defensible cyclical timing for that part of the advertising budget which has cumulative long-run effects. Further, when nothing is known about the effects of advertising, it sets reasonable limits to the gamble which advertising expenditures entail. Further, it might be argued that everything above a "reasonable" return on capital could be spent on advertising, since excess earnings have

low utility to management as such, compared to the possible contribution of continuous advertising to the eternal life for the firm. Nevertheless, such a method has the grave shortcoming of basing management decisions regarding advertising on less clear evidence about the effects of those decisions than could be made available through alternative approaches to the advertising problem.

#### **Objective-and-Task Approach**

During World War II, the objective and task method of determining the advertising appropriation became prominent. The increasing popularity of this approach during the war stemmed in part from the need to justify advertising expenditures as business expenses during a period when the volume of civilian goods sales would have called for trivial advertising outlays under most other methods of determining the magnitude of the appropriation. This method involves (1) defining sales objectives, (2) indicating the kind and magnitude of advertising required to obtain these objectives, and (3) determining the cost of the required advertising. This cost is the advertising appropriation.

The objectives are various, ranging from the desire to increase sales to such things as promoting new applications of the product, keeping the company's name before the public, making prospects easier to sell to, etc.

Nobody can quarrel with the procedure which involves the explicit formulation of objectives and the adapting of advertising and other means to the achievement of these objectives. The basic objection to the objective-and-task approach is that it lists objectives without the determination of the value of these objectives and the relationship of this value to the cost of attaining them. The method assumes that the candle is always worth the cost. Quite often, such an assumption will result in advertising expenditures which exceed their value to the company making them.

#### **The Competitive-Parity Approach**

The essence of the competitive parity approach is to base the company's advertising outlay on the outlays of other members of the industry. The relationship to competitive outlays need not always be the same but often is. For example, a company's percentage of competitive advertising might be made equal to its share of the market.

This method of determining the advertising budget is fairly widely used. Perhaps its use is based upon the belief by many business executives that advertising is largely defensive, designed to check the inroads of competitors.

The parity approach is sometimes defended on the ground that the advertising percentages of competitors represent the combined wisdom of the industry. This argument assumes that rivals know what they are doing and that the goals of all competitors are the same. Actually, there is often great variation within an industry with regard to the percentage of sales which different

companies appropriate for advertising. Because of this variation, the use of an average to represent the policy of all competitors is relatively meaningless.

The parity approach is dangerous. There is no known or systematic relationship between advertising expenditures which match competitors' outlays and the value of such expenditures to the company making them. When the method used in determining the appropriation involves an attempt to maintain competitive parity, any correspondence between the cost of advertising and its value would be purely fortuitous. In the face of this basic difficulty the fact that the Parity Approach may stabilize competitive warfare in the promotion of products is not great enough to justify its use.

#### **Summary**

Viewed against the background of the Profitometrics Approach, the alternative methods for determining advertising budgets seem to have little economic justification. Although some justification can be found for all alternatives, none of them is as satisfactory as an approach which precisely relates the cost of advertising to the value which it creates for the advertiser. In order to see whether the Profitometrics Approach can in practice live up to its theoretical promise, now let us consider some of the problems in making the fundamental measurements required for its application.

### **Profitometrics—Measurements Required**

#### **Kinds of Advertising Effects**

The measurement of the effects of advertising can vary in two dimensions: (1) different kinds of effects, and (2) different techniques of measurement. We shall consider the alternative things to measure and the alternative ways to measure in order to see which combination of effects and measurement techniques can best provide the basic data for the application of the Profitometrics Approach.

There are basically four kinds of advertising effects that can be measured: (1) effects on behavior (sales), (2) effects on attitudes (usually brand preferences, but sometimes attitudes towards the company), (3) effects on intentions to buy, and (4) effects on the level of knowledge (usually brand awareness, but sometimes knowledge of product characteristics or uses).

Although sometimes the explicit purpose of advertising is to change people's attitudes quite apart from the effect of those attitudes on sales and profits—for example some institutional advertising by large producers of industrial goods directed at American households—this paper is restricted to a consideration of the effect of advertising on profits. We shall therefore judge the four kinds of advertising effects in terms of the light which they cast on the effect of advertising on profits.



Clearly the most direct relationship is between sales and profits. If we can measure the effect of advertising on sales, we have all the material necessary for the measurement of the profitability of the advertising. It should be noted in this connection, that it is necessary to take account of the effect of advertising not only on present but also on future sales. We must appraise the value of a new customer through measurement of his "loyalty-life" expectancy and through estimates of the volume of sales to him in the future as well as the added profits therefrom.

For measurement of all other kinds of advertising effects, it is usually necessary to translate observed changes in attitudes, intentions, or levels of knowledge into changes in sales, and this translation is often difficult. The translation can be avoided when the findings are negative, because it can plausibly be argued that sales could not have been favorably affected if there was no improvement in brand preferences, intentions to buy, brand awareness, etc.

The positive findings, however, are much more difficult to interpret since it is necessary to know how much of an increase in sales will result from a given improvement in consumer attitudes, intentions, or knowledge. Although the relationship between changes in these indirect effects and changes in sales can sometimes be estimated at given points in time by making both direct and indirect measurements, there is no assurance that the relationship will be stable through time. This is the basic fact that limits the usefulness of measurements of the indirect effects in determining the optimum size of the advertising budget. Therefore, the direct measurement of the effect of advertising on sales is usually the only firm basis for the application of the Profitometrics Approach.

#### Techniques of Measurement

Just as there are different kinds of effects that can be measured so there are different techniques for measuring them. Techniques can be put in three groups: (1) controlled experiments, (2) survey data and (3) historical data.

By far the most powerful technique available for the measurement of the effect of anything—be it chemical compounds or advertising—is the controlled experiment. No other technique provides such precise information with so little ambiguity. The process of controlled experiments should be thoroughly understood. It is understood in the natural sciences but there is ample evidence that businessmen have failed to understand and utilize fully this very powerful technique for providing useful information.

There are really only three basic principles to controlled experiments: (1) it is necessary that the factor being investigated—whether it be advertising or penicillin—be administered to identifiable sub-groups of the entire group in which you are interested. If you are interested in all consumers in the United States, you must administer

your advertising to only a portion of these consumers; (2) it is necessary that sub-group which is exposed to the facts being investigated be representative of the entire group which is of interest. (This means that the sub-group must be selected by some random process, defined in its technical, statistical senses); (3) it is necessary that there be a measurement of the difference between changes in the sub-group and the rest of the group (or some portion of it) before and after the administration of the factor whose effects are under investigation. (This means that controlled experiments on the effects of advertising would involve measurements of the rates of sale before and after the advertising to groups which had been exposed to the advertising and groups which had not.)

An experimental group of 10 markets was selected at random and a control group of 10 markets was selected at random. The rates of sale in the two groups of markets were measured before advertising was undertaken and after advertising had been undertaken. It was found that the rate of sale in the control market increased 2.0% and in the experimental market by 6.25%. Thus the advertising was responsible for an increase in the rate of sale of 4.25%.

Many businessmen fail to understand that experimentation which has been so productive in the natural sciences can be used with equal validity in business and advertising research even though the subject investigated is the uncontrollable behavior of people. The actual designing and interpretation of experiments is a technical process to be performed by trained statisticians but you should have an understanding of the tremendous value of the experiments to all business executives responsible for the control of substantial discretionary expenditures.

The other techniques of measurement involve either historical or survey data and can often be secured with less planning, cost, and technical knowledge than is required for experimentation. The basic and inevitable deficiency of non-experimental data is that it is never possible to be sure what they mean. There is an inherent ambiguity in all non-experimental data which makes it impossible to identify and measure with certainty and precision causal relationships. If you were interested in measuring the effect of advertising on sales with the use of historical data relating to advertising and sales, you would always be running a serious risk that any observed correspondence between increases in sales and advertising were the result of something other than the effect of advertising on sales. It might have been, for example, that the advertising budget was fixed as a percentage of sales and hence that sales determined advertising rather than vice versa. Or conceivably both advertising and sales increased during periods of rising national income and prosperity and decreased during periods of declining national income and depression. Under these circumstances it would be impossible to identify and measure the isolated effect of adver-



tising on sales. The picture gets even more confused when one considers the possible effects of variations in competitors' advertising and production policies during the period for which the historical data are available.

Nor is survey data regarding causal relationships free from the serious blemish of ambiguity. No amount of data can prevent the possibility of several different and perhaps equally plausible interpretations of the results.

Under such circumstances the interpretation which is often chosen is one which conforms to preconceptions or prejudice. And, in such cases, the function of the measurement is largely destroyed.

To sum up, Profitometrics requires the measurement of the effects of advertising on sales and the effects of sales on profits. These effects ideally should be measured by means of controlled experiments and any cumulative effects should be examined in terms of the investment return produced by the stream of incremental profits over the loyalty-life expectancy of the customers acquired by the advertising investment.

There are a number of reasons why the Profitometric Approach has not been widely used in determining the advertising appropriation. The basic explanation for this oversight lies in (1) lack of a determined desire to find the most scientific solution for this intricate management problem, (2) ignorance of the potentialities of modern research techniques for this problem, and (3) quite normal distrust of practically any sort of an analysis which is not easily understood by the untrained layman. Economic analysis, even in its most managerial applications, sounds academic, and an investment approach to the advertising expenditure is unfamiliar, at least in its metric aspects.

I have painfully experienced the practical difficulties of developing controlled experiments in this area, and I know that competitors can sometimes, without making the outlays, find out too much about research findings and even under some circumstances distort results. I am aware of the fact that variables in social and business activities are numerous and hence that it is impossible to control all variables except the one under study. But this is also impossible in the physical sciences and it has not prevented the enormous productivity of the controlled experiment here. The variation caused by factors other than the one examined is greater in the social sciences but the fact that we know it is bigger permits us to design the experiment in such a way as to show us how much of the variation comes from this cause.

When the measurements ideally called for in the Profitometric Approach are not feasible, it is sometimes possible to obtain, by inferior means, suggestive indications of the effect of advertising. Information about changes in consumer attitudes, buying intentions and levels of product and brand knowledge can sometimes provide negative in-

formation about advertising effects. However, for positive usefulness it is necessary to measure the relation between sales behavior and these indications of buying conditions. Bridging this gap metrically is difficult indeed.

### Profitometrics—Applications

In the preceding sections we have examined (1) the key ideas of the Profitometrics Approach, (2) the characteristics of alternative approaches, and (3) the measurements necessary for the application of the Profitometrics Approach. If these measurements are made competently, the advertiser has at hand good information on the effect of some particular advertising on his profits. Management is then faced with the decision as to whether the continuing of such advertising—presumably with the continuation of the same effects—is justified. The decision regarding the wisdom of making an appropriation for advertising should be based on the same considerations as decisions regarding appropriations for other purposes. In other words, business management is faced with the old and familiar capital budgeting problem.

The decision as to whether more or less should be spent on advertising depends on the profits which could be created by alternative uses of the funds. Management must estimate the profit from money spent for advertising and compare that with the profit on money spent for alternative purposes. If profits could be increased by diverting some of the current advertising budget to other purposes, then the advertising budget is too big. If, alternatively, taking money from some alternative use and diverting it to advertising would increase profits, then the advertising budget is not big enough.

One of the alternative uses to which the advertising budget could be put is other kinds of advertising. And, in order to decide whether the advertising budget is too big or too little, it is necessary to consider the effect on profits of a different kind of advertising program than the one whose effect on profits has already been determined. I believe that on the infrequent occasions when advertisers have attempted to measure the effects of advertising and have found that the increase in sales did not warrant the advertising expenditure that advertising agencies have sometimes suggested that the advertising budget should be maintained but allocated in different ways. Because of the tremendous faith in advertising which is prevalent in American business, management is always tempted to believe that any demonstrated inefficacy in an advertising program is a consequence of the mis-direction of the program and that alternative media, themes, and frequency would yield better results.

I recommend that the belief that some alternative advertising program would be more profitable than one whose lack of profitability has been demonstrated be viewed with suspicion and tested when possible. Unless there is good evidence to

support the belief that some other advertising program would be more profitable, I would say that evidence that the current program is not as profitable as some use of funds for non-advertising purposes is sufficient grounds for reducing the advertising budget.

What is good evidence? Sometimes it is possible by fairly cheap and small scale experiments to decide whether one kind of advertising is better than another. Sometimes alternative proposals for advertising in national media can be tested against a measured norm through the use of low rate, local media, and some work has been done through the use of handbills in a strictly controlled but small-scale experiment. Through the use of a few local markets (or stores when handbills are used) it is possible to measure experimentally the relative effect of alternative advertising on the attitudes of consumers or upon sales.

Thus, management can, through the use of small expenditures for research, acquire insurance against the making of costly mistakes. By making the expenditure necessary for small-scale local experiments on the relative effect of alternative advertisements, management can diminish the risk of continuing to make very large expenditures in unprofitable ways. Or, by such means, management can come to recognize and subsequently exploit the relatively profitable opportunities which the experiments disclose.

### Conclusions

In conclusion, I should like to re-state briefly the main points of my talk:

1. In principle, profits can be maximized by establishing the advertising budget at that point where the added advertising cost of increasing sales by one unit is just equal to the incremental profit (before advertising) which the additional sale will create. The application of this principle by appropriate measurement is, surprisingly enough, a novel approach to the establishment of the advertising budget. I have called this the "Profitometrics Approach."

2. Many alternative approaches are now used, among them: the percentage-of-sales approach, the "all-you-can-afford" approach, the objective-and-task approach, the competitive-parity approach. Although each of these has some advantages,

each has the grave defect of failing to make the advertising decision depend upon a measurement of the effect of the decision on the success of the company in achieving its objectives.

3. The measurements necessary for practical application of the Profitometrics Approach can be made. Of the various kinds of measurements possible, the measurement of the effect of advertising on sales through the use of controlled experiment, is by far the most precise and powerful means available to management.

4. Once the effect of given advertising on sales has been determined, management must then decide whether that effect is worth the funds required. For advertising whose significant effects are "quick and dead," as in our example of direct mail sales of a book, the incremental profit obtained from the sale is an adequate measure of worth.

5. But for advertising whose impact is delayed and cumulative and whose results may create a stream of repeat sales, a more complex measure of worth is needed. This is because such advertising is really an investment. Purchasing customers by advertising is like purchasing annuities. The value of a customer like the value of an annuity, is the present-worth of the stream of future profits he will produce. How long this stream will last, which has a profound effect on customer-worth, is determined by your new customer's loyalty-life. Consequently measurement of loyalty-life plays a vital role in our Profitometrics Approach to most advertising (other than the quick-and-dead type of advertising).

6. Since much advertising is really an investment (happily expensable for tax purposes) it ought to be made to compete for funds with alternative ways of investing them. And this rivalry for capital should be on the basis of profitability. The present worth of the stream of profits which the advertising can yield should be compared with the present worth of the stream of profits which could be achieved through some alternative use of funds.

7. Among the alternative uses which must be considered are alternative kinds of advertising. Before such alternative uses be accepted as superior to the tested advertising program, some good and presumably objective evidence should be acquired. This evidence can be acquired at relatively low cost by small-scale controlled experimentation based on low-rate media.



## 2. ENGINEERING AND RESEARCH

### BUDGETING FOR ENGINEERING COSTS

By CLYDE SEELEY and BOB SUTTON\*

Much of the past interest and effort of the concept of budgeting has been concerned with manufacturing costs. However in the competitive markets of today other areas of cost are worthy of attention. Among these areas is the effort concerned with product development and improvement.

It is basic to consider that the profit motive is still the driving force behind industry today. This point, obvious as it may seem to be, is often overlooked or lost in the anxiety over our immediate problems. The engineering mind, technically trained as it may be, often overlooks the simple economics that must function properly to make funds available to support and perpetuate its purposes. Do not assume, therefore, that everyone completely understands that the objective of your company is to operate profitably. Discuss the point freely, get agreement, and you will find firm footing invaluable for later use in budget work. Industry's desire and need for profits unquestionably is a reason for budgeting engineering costs.

In the search for profits it is generally agreed that control of costs will have a most marked effect on possible attainment. Take a good look at the charges originated by the engineering department. Do they need control? It is a rare situation indeed that could not be improved by good expense control.

Many of us are vitally concerned with the productivity of shop workers. But what about the performance of the engineering phase of the business? Is it not reasonable to expect results worthy of the cost expended for this purpose? Then why not find a way to help evaluate actual accomplishment against expected performance? Successfully carried out, such a plan would result in better engineering for less cost.

#### The Engineering Function

There are, however, some considerations that may be termed peculiar to the engineering function. These considerations emanate from the mental makeup of the engineers themselves. Many of them operate in a situation where solutions, not costs, constitute the main objective. It is urgent that the scientist not be burdened with problems

of financial controls when the successful solution to a product promising millions in profit should occupy his total thinking.

Problems of expense control should be directed to the administrator rather than to the producing engineer. A prudent and judicious reference to items of real importance that affect the outcome of the entire planned expense should be the criterion on which to place the emphasis. Control properly applied and directed will yield results even in the engineering effort.

The effective engineer is a dreamer. This fact is an asset to any business but especially to one which wishes to thrive and grow. However, there must be a portion of practical business sense injected into such a situation. Lacking this there is a great danger of pursuing an idea far beyond any reasonable hope of solution. Many ideas are explored in research work only to be found impractical for commercial purposes; others, too advanced for today's economy must be shelved until a more opportune time; still others, and they are in the vast majority, finally result in such notorious failure that the total effort may be considered a horrible waste. How fortunate that a few ideas really do become commercially practical and that resultant profits permit further study of new ideas.

Since it is likely that new products are vulnerable to failure, any plan that would help diminish unnecessary losses would be a welcome accomplishment.

Profits from products already being exploited commercially may decline and become decadent if the product fails to keep pace with competition and consumer demands. It is imperative that the stature of existing products be maintained and improved if going profits are to be enjoyed by the producer. Costs related to this engineering effort may astonish management when presented in the proper way.

#### Developing a Budget

Someone in management will certainly bring up the question of how much should be spent for engineering. Barring a flat and highly arbitrary per cent of income grasped at in desperation, a practical suggestion as to how much the business can afford may well set the expense level. Modern day products delve into the basic sciences so deeply that competitive situations demand a staff comple-

\* Published in Technical Notes, Vol. II, No. 7, April 1954, Mr. Seely is with P. R. Mallory Company; Mr. Sutton, E. C. Atkins & Company, is chairman of the research committee, Indianapolis Chapter.



ment embracing many lines of knowledge not necessarily compatible with management's overall thinking. As a result, industry is being forced into spending tremendous sums to satisfy this demand. The expense level for any company surely must be regulated and aligned with ability to support the effort and evaluated against the promise of rewards of the future.

We have explored some of the reasons why engineering costs might yield better results when subjected to control by use of a budget system. A list of reasons compiled for your company would surely uncover additional points. Regardless of the scope of the problem, the theory that budgets help achieve better results in the engineering program must be definitely proven. Once proven by actual demonstration there should be little difficulty in securing final approval to proceed with the plan.

In order to demonstrate the merits of the budget, a prototype of the actual budget should be prepared. In this way the objectives that must be reached can be discussed and the prototype plan adjusted to fulfill all requirements. Broadly speaking, the best budget plan would be the plan that continually checks the tendency of the engineering effort to spend more than was planned and to highlight those items falling short of expected accomplishment.

When the details of the budget plan appear to fulfill all requirements, the entire package should be presented to top management for final approval. Only after approval is secured and complete accord from all sources is reached can there be unanimity of thought and action in carrying out the actual principles developed by the budget. It is also a must to carry the approved plan down through the lower echelons of management to the spot where the actual budget will be developed.

In analyzing the operating costs of the engineering development, much of the function will tend to parallel the familiar pattern used for costing manufacturing operations. I refer to the cost of payrolls which may be compared to direct and indirect labor of the factory according to the particular interpretation and treatment practiced. Additional costs will be found for materials used as well as many indirect items such as supplies, maintenance, utilities, small tools, etc.

The end product of the engineering effort can be likened to a production work order. The purpose of the work order is to sum up the cost incurred in performing a specific task. A remaining problem in cost determination would be to apply payrolls, material costs, and indirect costs to work orders, or to use a term more acceptable to engineers—to projects. This can easily be accomplished by expressing the direct portion of the payroll and attendant indirect costs as a rate per man hour. From reports of man hours assigned to projects the cost per hour will develop this portion of the project cost. The remaining factor of materials or other direct charges to projects can be developed from a requisition basis.

The fact that cost can be correctly applied to specific projects presents the opportunity for further use of projects. For example, consider the possibility of describing the purpose of the project so that evaluation as to its merits can be a subject for management review from a statement of the project rather than from payroll and other statistical data. Since approval of the budget and its subsequent control to this plan is the ultimate objective, the presentation for approval of the actual budget should specifically answer such questions as:

- A. What products will benefit by this expenditure?
- B. Is this project of a research nature?
- C. Does the project benefit most of those products already in production?
- D. What are the probabilities of success?
- E. What is the extent of capital required?
- F. Approximately when will the project be completed?
- G. What is the approximate net gain estimated for the project?

The budget would be reduced to writing in order that proper and complete comparison with the actual results can readily be made. In the actual preparation particular attention and care should be used to insure that the budget and actual results will compare like points. An interesting by-product of this approach will be the education of those responsible for performance against the budget. Many good points conducive to better control will be brought out for open discussion and very possibly will reach a satisfactory solution.

### Follow-Up

Comparison of actual performance against the planned budget should be the highlight of the entire program. The timeliness and accuracy of comparative reports should add much to the overall effort by instilling confidence in those responsible for performance. Above all there should be a round table discussion of all points showing a variation from the budget. It will be a fruitful effort that has as its main goal to analyze, explain, and enforce the plan of action approved by top management.

Periodic reports and discussions will help point out how well the original objectives are being attained. In a fast moving business and economy, changed conditions sometimes cause original concepts to be materially changed. As a consequence it is important that the entire program be closely watched from the standpoint of improvements that will strengthen the results of the engineering effort. An example of this might be to step up the frequency of reporting from a monthly to a weekly basis on items that are particularly troublesome.

A good presentation and one that usually meets with the thinking of most engineers is to construct

actual events in graph or chart form. Confined to the progress of specific projects, such presentation will quickly analyze where funds are being spent as well as raise questions as to whether the effort should be diverted to other urgent conditions.

### Conclusion

Engineering efforts constitute the life blood of our every day economy. That economy must show

progress if industry is to prosper. Those dependent on this prosperity for higher standards of living most assuredly will see to this by constant demands. The strong will meet these demands by astute application of available funds. Budgeting can and will find its place in this effort for there is boundless enthusiasm in the hearts and minds of industry's talent to achieve for tomorrow that which is beyond reach today.

## DEVELOPING A RESEARCH BUDGET

By H. H. HOPKINS\*

Our standard of living in times of peace and our national security in times of war depend in large measure upon progress in scientific research and development. Through research, new facts, new techniques, and new physical laws are discovered. Through applied research and development, these findings are utilized for the creation of new or improved materials or methods. Research and development have been tremendously stimulated by the technological needs of defense.

World War II was the first war in history to be affected decisively by weapons unknown at the outbreak of hostilities. The development and use of the Atom bomb clearly illustrate how military, strategic, and tactical policies can be affected by the results of concentrated research and development. The Korean War has given a further impetus to research and development activities.

### The Growing Importance of Research

Research expenditures are a significant and increasing portion of total national income, comprising almost one per cent of the total in recent years. The actual amount spent on research more than doubled in the decade of the 1930's and then tripled again in the 1940's.

Scientific research personnel has expanded half as rapidly as the increase in expenditures, the difference in rate being a reflection of inflation.

In view of the importance of research to Defense Department activities and plans, a survey<sup>1</sup> was made in 1952 of industrial research activities by The Research and Development Board in the Department of Defense in cooperation with the Bureau of Labor Statistics. This survey clearly demonstrated the growth of research expenditures in the United States from 1941 to 1952. For pur-

poses of the survey, research was defined as "Basic and applied research in the sciences and in engineering; and design, development and testing of prototypes, and processes. The survey excluded quality control, product testing, market research, sales promotion, sales service, and research in the social sciences and psychology."

The over all results of the survey are presented in Chart 1. This chart shows that some \$3.75 million was spent on research and development in 1952, an expenditure of more than \$20 for each person in the country. Of this vast sum of money, two-thirds or nearly \$2.5 billion was expended in projects carried out in the laboratories or other facilities of American industry. The growth rate from 1941 to 1952 clearly demonstrates a need for some sort of control over such rapidly growing expenditures.

The \$2 billion cost of research performed by industry in 1951 is broken down by type of industry in Chart 2. Two other measures of the importance of research in these industry groups are shown in Charts 3 and 4, which like Chart 2, are based on the same government survey represented in Chart 1.

The costs and employment data shown in Charts 2 and 3 are, of course, affected by the relative size of the industries involved. This factor is taken into account in Chart 4 in which research costs are expressed as a percentage of sales. On this basis it becomes apparent that four industries have research costs in excess of the overall average of two percent of sales. The importance of the defense program to the development of industrial research is indicated by the fact that three of these four industries have received contributions from Government for a large portion of their research costs—85% for the Aircraft industry and 57% for Electrical Machinery and for Instruments. The fourth industry—Chemicals—(with which the remainder of this talk will be concerned) has received a relatively small portion (7.1%) of its research costs from the Government.

\* Presented at the National Conference, Hotel Penn-Sherwood, Philadelphia, Pennsylvania, May 20-21, 1954. Mr. Hopkins is Assistant to the Treasurer, E. I. du Pont de Nemours.

<sup>1</sup> "Scientific Research and Development in American Industry," Bulletin No. 1148, Research and Development Board, Department of Defense, April, 1953.

In a world which is becoming increasingly scientific minded, it would seem reasonable to expect that research expenditures will increase from the 1952 base at a rate faster than the nation's population. It is important that some measure of control be exerted by management over this mushrooming research activity. Research budgets are one answer to this need for control.

### Why du Pont Budgets Research Expenditures

Since this talk must be based primarily on my own company's expenditures for and experience with research, let us take a quick look at how du Pont's expenditures for research have increased over the past decade, as shown in Chart

5. The figures speak for themselves as to the importance of du Pont's research costs and the desirability of controlling them by means of an annual budget. Unfortunately, our figures for 1941-1945 are distorted and are not comparable to the later figures; consequently, we have projected a curve for research expenditures for these years and omitted corresponding percentage ratios against sales and investment.

Of interest in connection with control of research expenditures, are ratios of research dollars to sales volume and plant investment. To illustrate, du Pont in 1953 made research expenditures of \$58MM. This sum amounted to 3.3% of net sales (\$1,750MM) or 3.1% of average investment including working capital (\$1,866MM).

CHART 1  
RESEARCH AND DEVELOPMENT EXPENDITURES IN THE UNITED STATES AND  
COST OF RESEARCH AND DEVELOPMENT PERFORMED BY  
GOVERNMENT, INDUSTRY, AND COLLEGES AND UNIVERSITIES

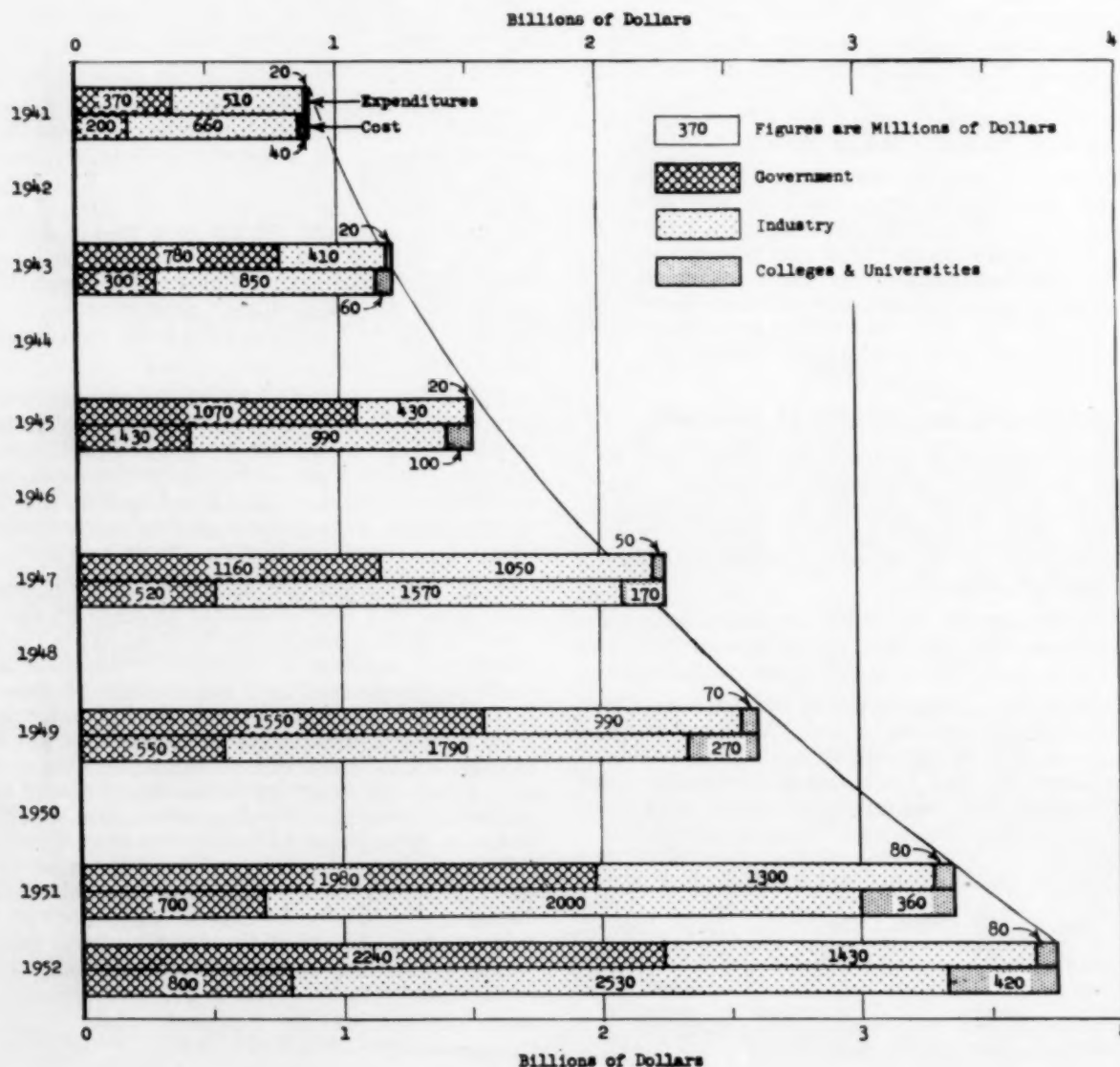
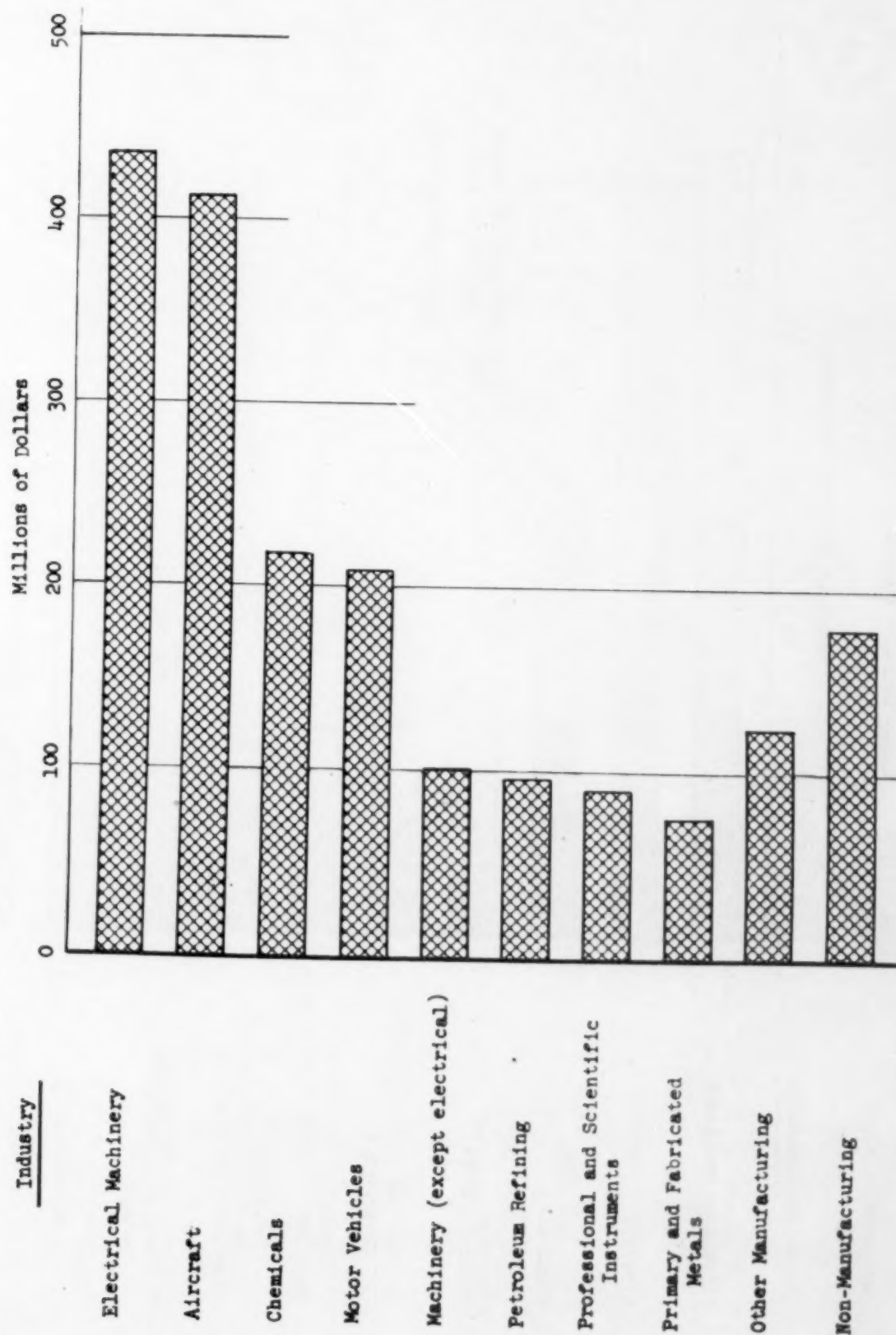


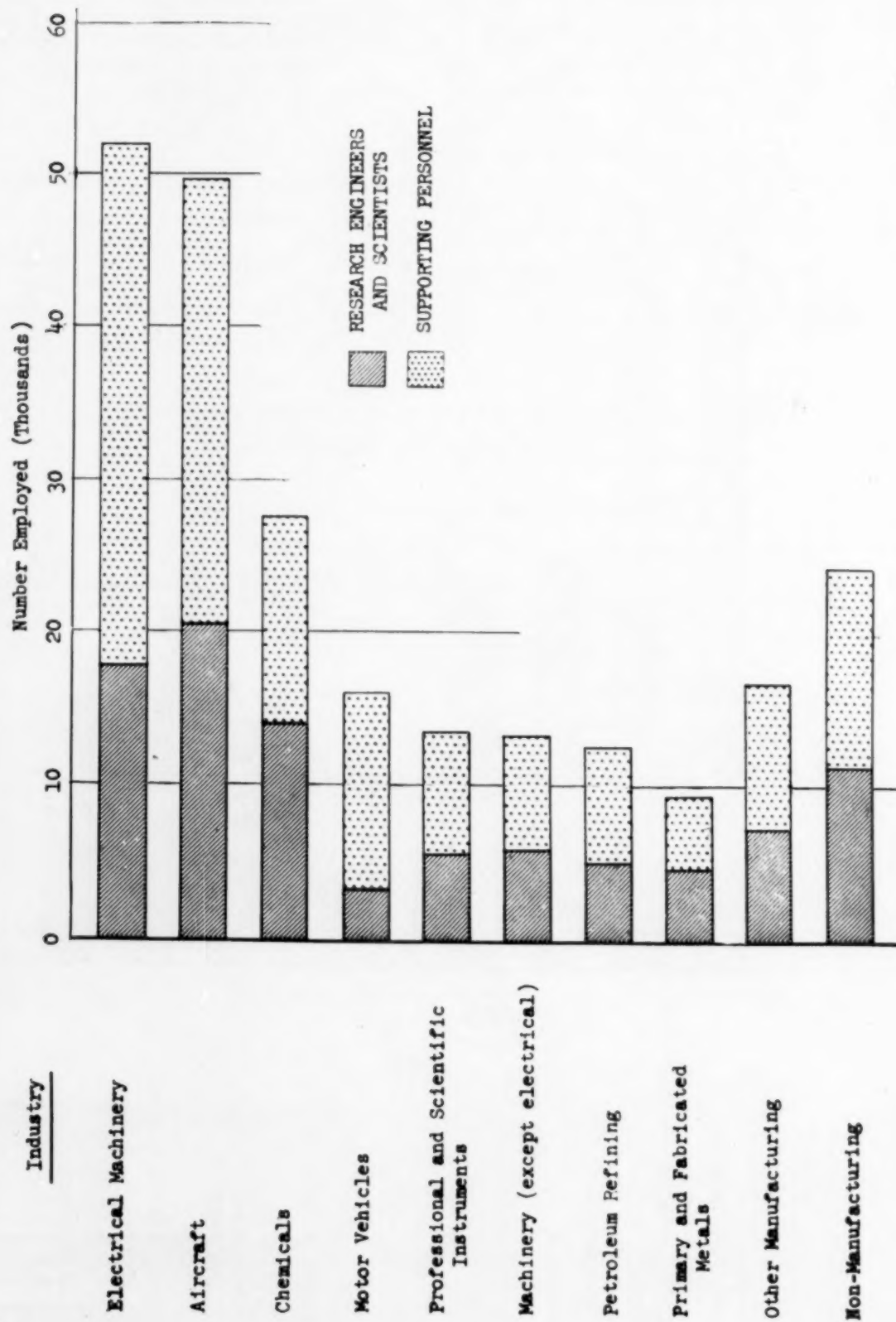


CHART 2  
RESEARCH COST—BY INDUSTRY  
1951—\$2 Billion



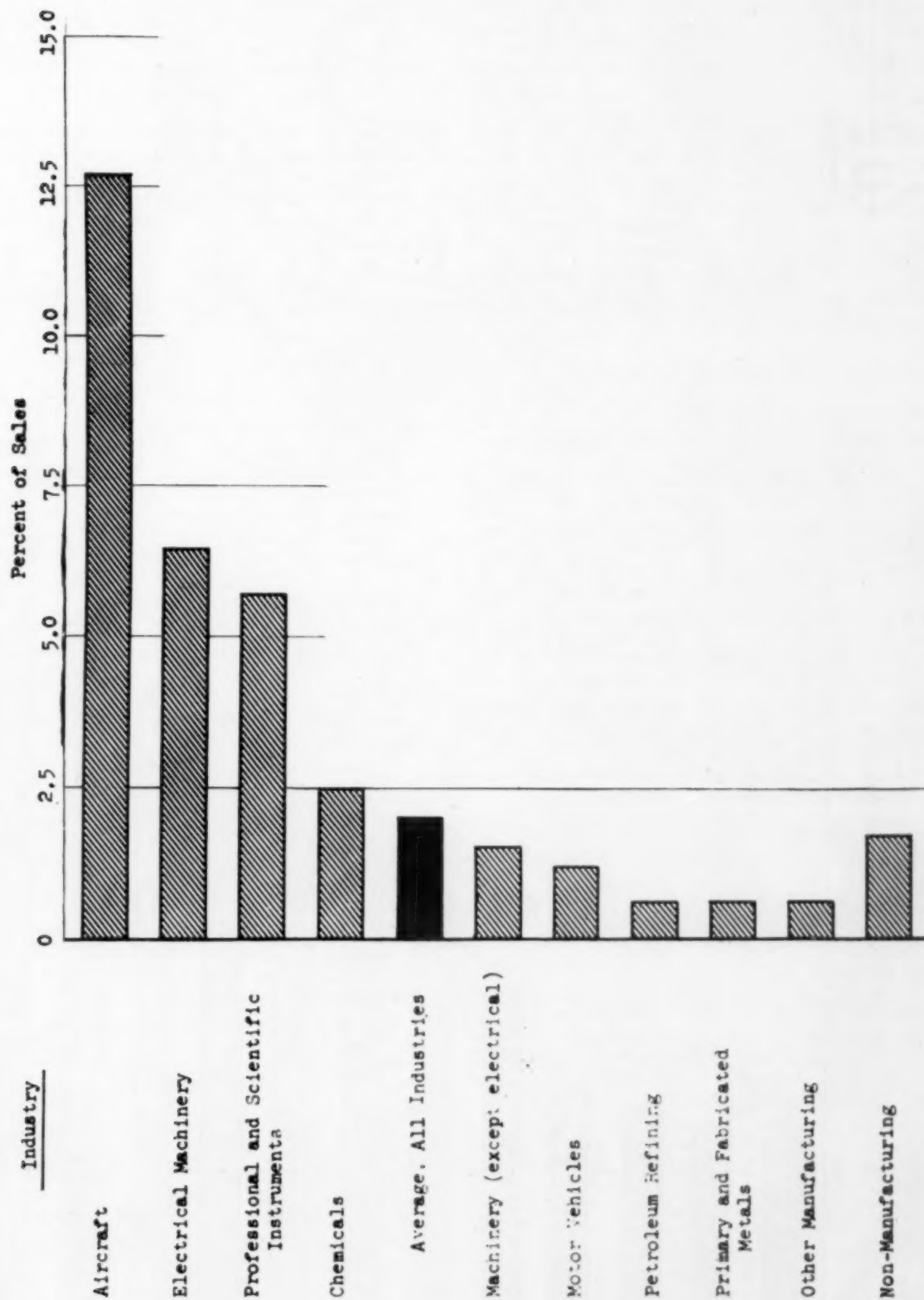
See Chart 3, Page 8 Preliminary Report - "Industrial Research and Development"  
BLS, Dept. of Labor and Research and Development Board.

CHART 3  
RESEARCH EMPLOYMENT—BY INDUSTRY  
January 1952—234 Thousand



See Chart 1, Page 5, "Scientific Research and Development in American Industry".

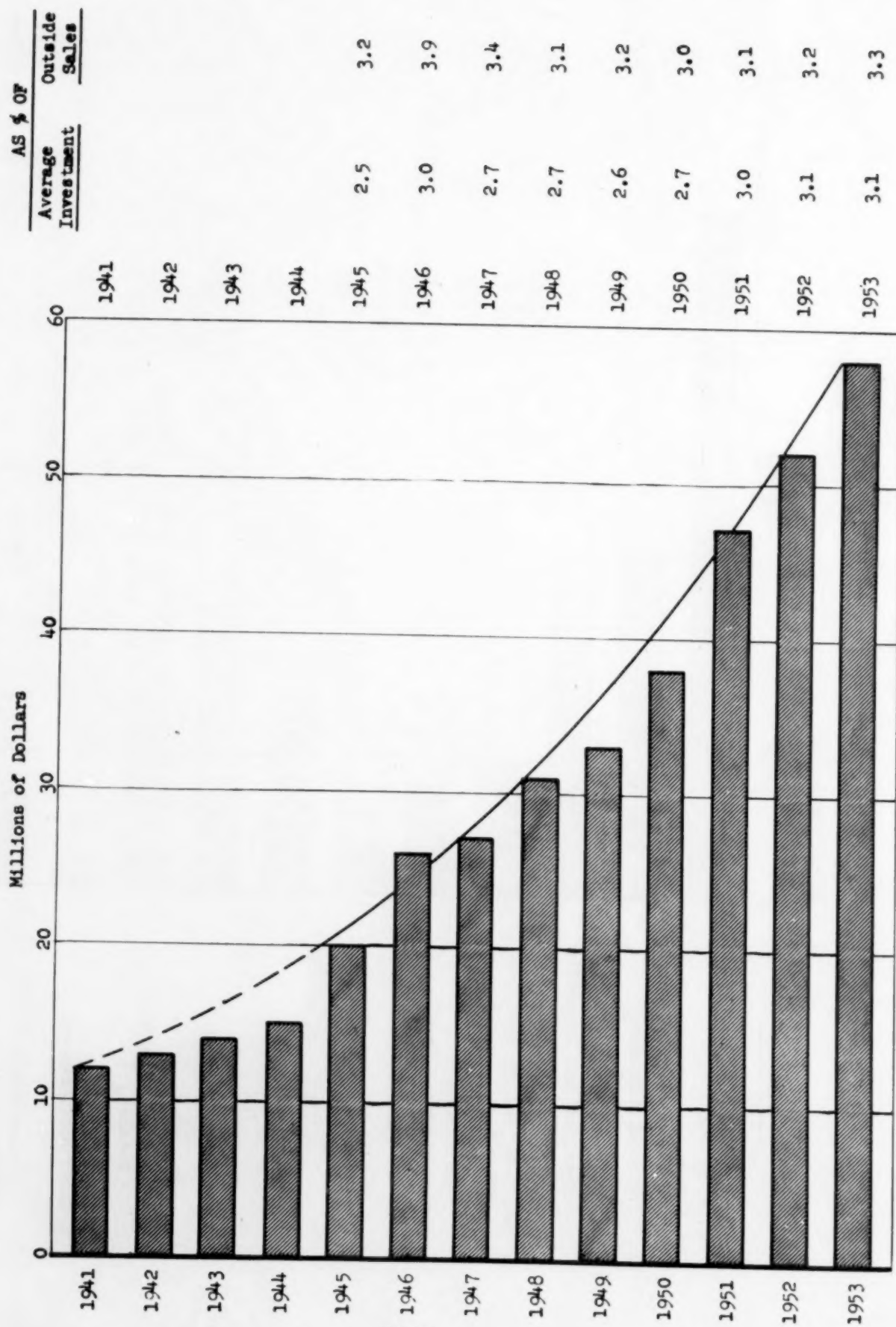
CHART 4  
RESEARCH COST AS PERCENT OF SALES—BY INDUSTRY  
1951—Average 2%



See Chart 6, Page 13 Preliminary Report - "Industrial Research and Development"



CHART 5  
RESEARCH EXPENSE—DU PONT COMPANY



With research expenditures for 1953 exceeding the dollar volume of sales of our smallest operating department and amounting to 38% of net operating earnings (\$153MM), it is obvious that du Pont's financial management wants to have a control on expenditures for research and their resulting impact on earnings. In practice, top du Pont management very largely leaves up to the operating department's general management the size of the research budget that the department wishes to support. Top management also leaves it to the operating management's discretion as to how the budget dollars should be spent for research.

It is important, before we proceed further on this matter of budgets, to know exactly what we in du Pont mean by the term "research." A definition is necessary since many companies have different ideas as to the meaning of the term "research." Many attempts to compare research expenditures by various companies have been of doubtful value because the data are not based upon the same concept of what constitutes research. Research, for du Pont purposes, comprises critical investigations in the physical and natural sciences directed to the discovery of new knowledge. The definition covers both pure and applied research.

Broadly speaking, du Pont classifies all technical work under a general heading of "Technical Activities." "Technical Activities" are sub-divided into four categories, namely: "Research," "Technical Assistance to Production," "Technical Assistance to Sales," and "Patent Work." Plant raw-material and finished-product control activities are not classified as a "technical activity."

In the year 1953, du Pont spent a total of \$97MM for all "Technical Activities." This sum sub-divided against the four above classifications of activities becomes: Research—\$58MM; \$23MM for Assistance to Production; \$14MM for Assistance to Sales; and finally, \$2MM for Patent Work.

Since we are dealing today with research budgets, we will refer very briefly to the expenditures on non-research "technical activities" and then dismiss them from further discussion. The term "Technical Assistance to Production" comprises the application of available, or easily acquired knowledge to non-routine problems arising in connection with existing plant processes or the start-up or minor modification of new plant processes. Excluded are control of raw materials, operating procedures, and finished product quality. Technical Assistance to Production is charged directly to cost of production or Mill Cost. The amount budgeted is largely under the control of the Director of Production of a given operating department, subject to approval of General Management.

"Technical Assistance to Sales" is charged directly to Cost of Sales. It is defined as the application of available, or easily acquired knowledge to problems arising in connection with the sale of existing commercial products or the introduc-

tion of new products, including the adaptation of such products to meet consumer requirements. It is largely under the control of the Sales Directors of the respective operating departments, always subject to general management approval.

"Patent Work" comprises all activities on patent matters and is subject to control by the Technical Directors of the operating departments with the approval of the General Managers. It is charged to cost of sales or cost of manufacture, depending on whether work is done for new or for existing products.

Since we shall now concentrate on research expenditure budgets, you should know how we subdivide, for budget purposes, research dollars. We have three sub-classifications which are described as follows:

I. *Research on Existing du Pont Processes and Products*

All research work concerned with improvements in existing du Pont commercial processes and products aimed at the manufacture of products at lower cost, or manufacture of products of better quality and consumer acceptance, or development of safer operating conditions.

II. *Research on New Processes, Products and Uses*

All research work concerned with new processes for the manufacture of new or established du Pont products, with products new to du Pont irrespective of manufacture by other companies and with major uses new to du Pont for new or established du Pont products.

III. *Fundamental Research*

Original exploration for the advancement of scientific knowledge in fields of present or potential interest to du Pont without regard to specific commercial objectives.

### **Establishing a Budget**

Now let us see what a typical research budget looks like and how it is prepared. Since you are probably interested in all aspects of the development of the research budget, it seems to me the most logical presentation would be to start with the annual consolidated budget that is presented to the Executive and Finance Committees for approval. Each operating and auxiliary department that conducts research prepares an annual research budget which is submitted to the Executive Committee early in November. Before the individual departmental budgets are examined, the Treasurer submits to the Committee a "consolidated technical expense and expenditure statement" which gives an over all picture of the Company's actual research expenditures for nine months plus forecast for last three months of the year. This consolidation relates current year costs to the proposed budget for the coming year. Let us look at a "consolidated statement" with figures omitted.

# CHART 6

E. I. DU PONT DE NEMOURS AND COMPANY

## CONSOLIDATED TECHNICAL EXPENSE (a) AND EXPENDITURES (b) STATEMENT SUPPLEMENTING THE 1954 RESEARCH BUDGETS

(Dollars in thousands to the nearest ten thousand)

### ALL TECHNICAL ACTIVITIES

1953		1954 FORECAST						
Forecast	Actual(c)	Amount	Research (Class A)		Tech. Asst. To Prod. (Class B)		Tech. Asst. To Sales (Class C)	
			Amount	As % of 1953 Actual(c)	Amount	As % of 1953 Actual(c)	Amount	As % of 1953 Actual(c)

Industrial Departments - Expense(a)  
Electrochemicals  
Explosives  
15 Other Depts. &/or Divs.  
Total - Expense

Auxiliary Departments - Expenditures(b)  
Chemical  
Employee Relations  
Engineering  
Legal (Patent Div.)  
Deduct: Work done for others  
Total - Expense

Total Technical Activities for  
Account of du Pont

1954 FORECAST		TECHNICAL PERSONNEL ENGAGED IN:									
Patent Work (Class D)	Classes as % of Total(u)					Research (Class A)			All Technical Activities (Classes A, B, C & D)		
	As % of 1953 Actual(c)	Research (Class A)	Tech.Asst. To Prod. (Class B)	Tech.Asst. To Sales (Class C)	Patent Work (Class D)	9-30 1952	9-30 1953	9-30 1954	9-30 1952	9-30 1953	9-30 1954
Amount											



# CHART 7

## E. I. DU PONT DE NEMOURS AND COMPANY CONSOLIDATED TECHNICAL EXPENSE (a) AND EXPENDITURES (b) STATEMENT SUPPLEMENTING THE 1954 RESEARCH BUDGETS

(Dollars in thousands to the nearest ten thousand)

### RESEARCH - CLASS A

1953		1954 BUDGET					
Budget Actual(c)	Budget as % of 1953 Actual(c)	Amount	As % of		Existing Processes and Products (A-I)	Categories as % of Total	
			1953 Budget	1953 Actual(c)		New Processes, Products and Uses (A-II)	Fundamental (A-III)

[ 71 ]

Industrial Departments - Expense(a)  
Electrochemicals  
Explosives  
15 Other Depts. &/or Divs.  
Total - Expense

Auxiliary Departments - Expenditures(b)  
Chemical  
Employee Relations  
Engineering

Deduct: Work done for others  
Total - Expense

Total Research for  
Account of du Pont

1953 ACTUAL(c)	1954 BUDGET	1953 ACTUAL(c)	1954 BUDGET	1953 ACTUAL(c)	1954 BUDGET	INVESTMENT IN LABORATORIES (INCLUDING ALLOCATED SERVICE FACILITIES) USED FOR:	
As % of Average Investment for		As % of Sales and Transfers for		As % of Operative Earnings for		Research (Class A)	All Technical Activities (Classes A, B, C & D)
1953(c)	1954(e)	1953(c)	1954(e)	1953(c)	1954(e)	Forecast September 30, 1953	Forecast September 30, 1954

If you will examine Chart 6, you will see that it presents a comparison of the current year's expenditures (9 months actual, 3 months forecast) by the various departments as compared with their forecast for the current year and their forecast for the next year. Details are presented by various sub-classifications of technical activities. Also included is a comparison of numbers of technical personnel for a three year period divided into "research" and "all other technical activities."

From the standpoint of over all control of expenditures, Chart 7 is important. It analyzes for the current year and the proposed budget year the research expenditures in terms of the three clearly defined types of research; and measures the expenditures in terms of percentage of average investment, percentage of sales and transfers, and percentage of operative earnings for the same period.

Also indicated on this chart is the investment in laboratory facilities, appropriately sub-divided.

This then is the financial picture used by the Executive Committee in arriving at decisions with respect to approving the size budgets requested by the departments. Each research budget is considered separately at a series of meetings with the departmental managements. The individual departmental budgets are studied in the light of the annual research reports which are submitted by the various departments at approximately the same time as the annual budget proposals. It is not unusual for the Executive Committee to request a change in the budget in the light of budget information, the annual research report, and conversation with the departmental management.

For purposes of understanding how the various departmental budgets are prepared, I will show you some of the statistical forms which make up the departmental budgets and which convey the statistical information that the Treasurer needs in compiling the consolidated over all company technical budget report.

Chart 8 shows how the current year's expenditures, when broken down by classes of research, are compared against the current budget expenditures.

As an additional control tool on personnel (and consequent technical expenditures) each department includes in its report to the Executive Committee a historical manpower ratio curve which

presents the number of research personnel employed by the department per \$1MM of investment going back some twenty years (see Chart 9).

Immediately following the personnel chart in the departmental report a comparison is made of research expenditures *per technical employee* engaged in research (Class A) work for the current calendar year and for the following budget year. A forecast follows of Research (Class A) expenditures which would be necessary for the year following the budget year to support the number of research personnel forecast at September 30 of the budget year.

Following the section on personnel, brief statements are made with respect to number of consultants retained, and noteworthy changes in organization and facilities which took place during the current year and are forecast for the forthcoming year should be shown. The total number of papers published during the report year are shown, and in addition the more significant papers are listed in tabular form showing title of paper, name of writer and publication (principal publications if more than one).

There is presented in concise descriptive form the important research activities and accomplishments of the department during the past report year and to the extent that it can be foreseen the substance of the expected program for each major subject or major field. Dollar figures, reflecting past or forecast expenditures, are shown wherever they serve a useful purpose in connection with discussion of any particular research subject.

Chart 10 shows departmental presentation of statistical data on research and other technical activities, and relationships of these to investment, sales and transfers, and operative earnings (Form 6, page 1, Accounting Department memorandum).

The detailed preparation of the operating department budget goes back to the individual laboratories who have forms on which they report on a monthly basis their expenditures in comparison to the budgeted monthly rate of expenditures, and in comparison to the previous month and to the average month for the current year to date. This monthly report gives the breakdown of the laboratory expenses against various cost codes. The budget for the coming year is quite readily prepared by reference to the latest monthly report form. Annual anticipated expenditures are set up in accordance with the best judgment of

CHART 8

FORM FOR BUDGETARY STATISTICS—INDUSTRIAL DEPARTMENT REPORTS

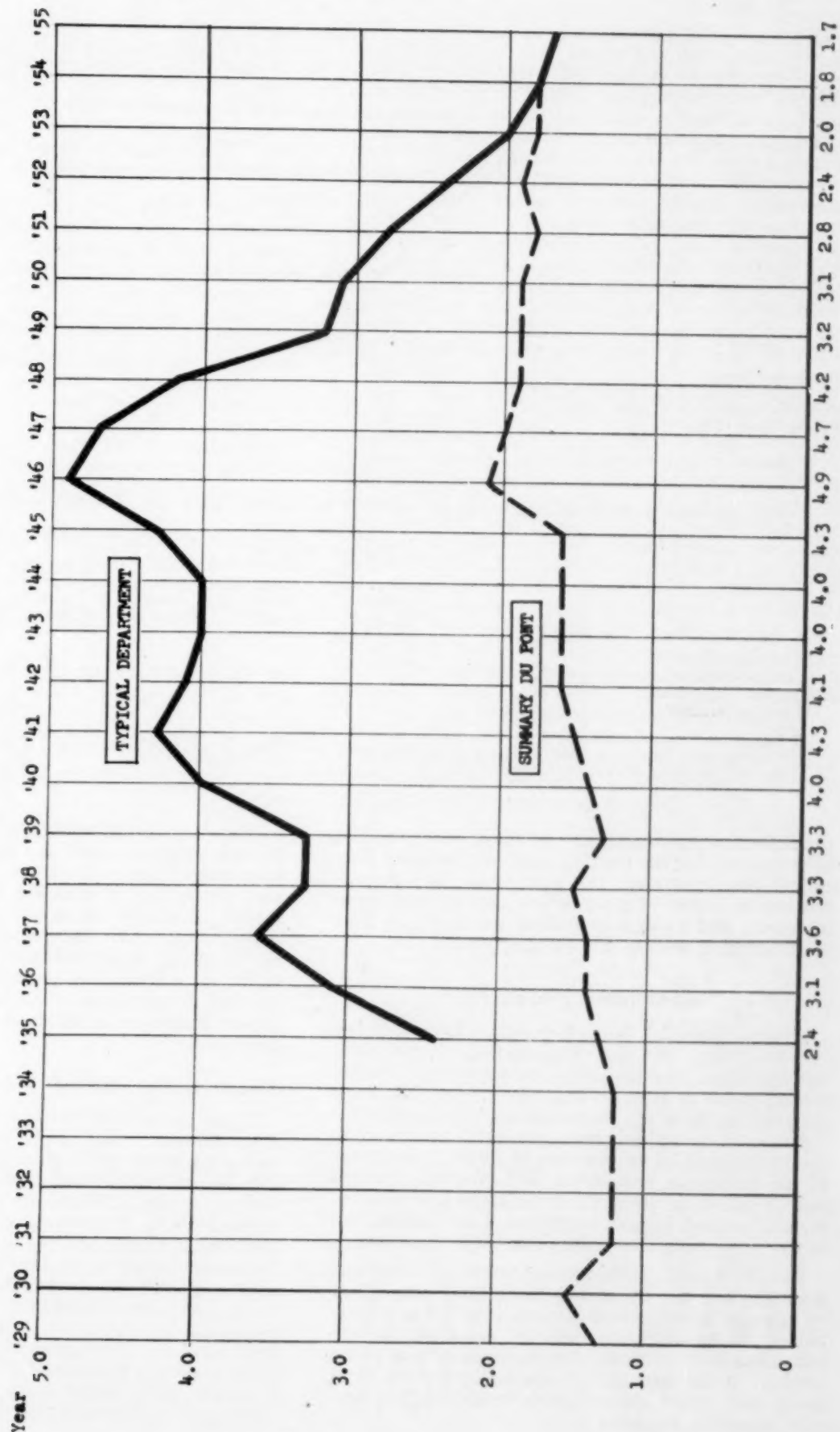
	Actual* Research (Class A) Expense 1953		Budget Research (Class A) Expense 1954		% Change 1954 Budget Over 1953 Actual*
	Amount	%	Amount	%	
Class A-I .....					
Class A-II .....					
Class A-III .....					
Total .....		100%		100%	

\*9 months actual—3 months estimate.

CHART 9

RESEARCH PERSONNEL PER \$MM OF TOTAL INVESTMENT

(Average Technical Personnel Engaged in Class A Research  
Divided by the Year-End Total Investment Adjusted to  
Price and Construction Indices of 1939)





## CHART 10

(These data are to be submitted by the several departments for the Vice President serving as Adviser on Research and Development and will be made available to any individual Committee member upon request)

### E. I. DU PONT DE NEMOURS AND COMPANY

Department

#### STATISTICAL DATA ON RESEARCH AND OTHER TECHNICAL ACTIVITIES

Year 1953-1954

(Dollars in thousands)

#### SUMMARY OF TOTAL TECHNICAL EXPENSE

	1953 Expense (9 Mos. Act., 3 Mos. Est.)	% of Total	1954 Budget Expense	% of Total	% Change 1954 over 1953
Research (Class A)					
Technical Assistance to Production (Class B)					
Technical Assistance to Sales (Class C)					
Patent Work (Class D)					
Total		100%		100%	

#### TOTAL TECHNICAL EXPENSE AS PERCENTAGE OF OPERATIVE INVESTMENT, SALES AND TRANSFERS, AND OPERATIVE EARNINGS

	Research Expense (Class A)		Other Technical Expense (Class B, C & D)		Total Technical Expense	
	1953 Expense*	1954 Budget**	1953 Expense*	1954 Forecast**	1953 Expense*	1954 Forecast**
Total Departmental						
Average Operative Investment	%	%	%	%	%	%
Sales and Transfers	%	%	%	%	%	%
Operative Earnings	%	%	%	%	%	%

\* Based on 9 months actual—3 months estimate.

\*\* Ratios are based on 1954 Budgets and Forecasts as related to 1953 #4 Forecast (12 months ending September 30, 1954) of Operative Investment, etc.

the laboratory management of their requirements of personnel for the coming year as related to personnel employed over the past year. Due consideration is given to prospective salary and wage increases and to any abnormal expenditure that is anticipated within the coming year.

### Accounting Procedure

After a research budget is authorized, it is the responsibility of the department head and, through him, the technical director and control manager, to determine that the budget is being adhered to. It is the responsibility of the control division to direct the managements' attention to the imminence of an overrun of more than 5% or of an underrun exceeding 10% for the budget year. If such an overrun or underrun is in prospect, a revised budget is prepared and submitted to the Executive Committee for their approval.

For technical management control purposes, accounts are set up in the individual laboratory to appropriately reflect the various types of expense. These accounts indicate whether the expense has been incurred for the department's own account or the account of another department or party and cover expenditures made against specific research projects.

You may be interested in a brief statement as to how research costs are distributed in du Pont. Research Class A-1 (work on existing products and processes) is charged to "Cost of Manufacture." Research category A-2 when related to products currently being manufactured is charged to "Cost of Manufacture." When category A-2 research is related to products not manufactured by the department, it is charged to "Cost of Sales." Research category A-3 is charged to "Cost of Sales."

### Measurement of Research Results

There have been articles published about various schemes which have been devised to financially measure the value of research. I am not familiar with most of these proposals and have not made an attempt to acquaint myself with them for the purpose of this talk. It is obvious that one gets into trouble in trying to measure the financial return from true research on anything except a very long-range basis. For example, du Pont spent some \$12MM in 1953 for fundamental research. At the time it is made, this research may have no discernible bearing on a specific du Pont product. It may be 10 years or more before a single sales dollar may be attributed to that fundamental research; or it may turn out that no

monetary value at all will result from some of this fundamental research. How then can one measure from year to year the value of such research?

In du Pont we make no attempt to measure the value of research by hard and fast rules. The Executive Committee keeps a finger on the cost and value of research in three ways:

1. The departments conducting research render monthly reports to the Executive Committee on the results of their operations and in the course of this report call attention to anything that is particularly noteworthy that is resulting from research activities.
2. The annual research reports convey a picture to the Executive Committee of the amount of money that has been spent and will be spent within the next year on the most important lines of research. Each one of these lines of research is briefly but completely reported for information of the Committee members.
3. The Vice Presidential advisor on research is in more or less continual contact with the technical directors and exercises considerable influence on the extent and type of work that they conduct.

The real yardstick that is applicable to research values lies in the construction of new plants or the introduction of new products as a result of research activities. The size of the annual construction forecast is therefore a concrete measurement of whether research is producing results.

A follow-up of production and sales accomplishments of these new plants or plant additions is provided through the means of the so-called accomplishment report. Accomplishment reports are rendered one year after a new or modified facility has gone into commercial operation unless some unusual factor has distorted such a year's performance, in which case the next full year will be reported. These reports call for statements comparing the volume of sales and the earnings from sales that have actually been attained as compared to the forecast sales and earnings that served as a basis for obtaining approval for the expenditure of the plant investment in question. In the attainment of the sales expansion from new investment lies the true measure of the value of research.

As a measure of du Pont's success in research, let me tell you that research expenditures since 1945 have amounted to \$312MM, a huge outlay of funds. However, average operating investment in the same period has increased by \$1,033MM to \$1,866MM. This increase is certainly related to the \$312MM research, or some earlier expenditure. In the same period of time, sales volume has expanded by \$1,139MM to \$1,750MM and operative earnings before federal taxes by \$420MM to \$542MM. Product wise, over 62% of du Pont's present line of products are "new" in the sense that they have been introduced for sale since 1925. To mention a few: Duco and Dulux finishes, Nylon, Dacron and Orlon, Neoprene, synthetic rubber, titanium metal, cellophane, and many others.

Yes, we in du Pont believe that research pays, but it must be controlled, and the best way to do that is by use of Research Budgets.





## **PART IV**

# **DECENTRALIZED MANAGEMENT PLANNING AND PERFORMANCE ANALYSIS**

- 1. Planning—Return on Investment**
- 2. Reporting and Performance Analysis**

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# 1. PLANNING—RETURN ON INVESTMENT

## PROJECTING FUTURE CAPITAL EFFECTS

By HORACE G. HILL, JR.\*

### Long-Range Forecast

The starting point of capital expenditure policy is at the grass roots of the enterprise where someone has appreciated his responsibility for making the best use of the investment entrusted to him and has a constructive idea. If he can obtain a certain amount of capital funds, he is convinced that he can invest these funds in such a way as to produce incremental net receipts, in sufficient quantity and in a short enough space of time, to indicate an attractive rate of return. He discusses his idea with his associates to see whether they can find any flaw in his reasoning. He finally presents it to his department head who convinces him that it should be given serious consideration. The department head may point out that the success of the proposal will depend upon the ability of some other department to supply or dispose of the increased quantity, and he makes that check promptly. If no obstacles have appeared in these operational reviews, the department head asks the engineering division to criticize any phase of the proposal to which some technical objection might be raised, including the rough estimate of the project cost. The idea is then ready for a computation of its probable rate of return and a forecast of when it will become an accomplished fact. The accumulation and coordination of these ideas provide the basis for the long-range forecast in its preliminary form.

In the meantime top management, through its staff or other available services, is exploring the outside factors which might exert appreciable influence on the company operations. These would include the probable trends in General Business Level, Material Prices, Labor Rates, Finance Market, Industry Competition, Specific Product Demand, Etc.

As the long-range capital expenditure forecast takes more definite shape, it is possible for the proper operating and staff personnel to agree on the composition of a forecast balance sheet, which should be made for each year. This step will give assurance that nothing has been missed, even though some features might have been treated superficially. The relationship between the plant account and the inventories, accounts receivable and profit are the principal points to watch. The cash account will be the balancing figure and will indicate the need for financing.

Although the capital expenditure projects, around which the forecast is being built, will show their effects through the project life span of between ten and thirty years, and although five years is the most popular planning span, many companies are using three years. The reason is that in most industries it is impossible to foresee the specific items of expansion or improvement which will appear five years hence.

When the preliminary long-range forecast has been properly clothed in its balance sheet garb, it is ready for discussion with the financial officers. In preparation for this review, the financial management has re-examined the company's capital structure, felt the pulse of the debt and equity markets, formed an opinion as to what the average capital structure of the company should look like during the next twenty-five years, and computed what the average cost of capital funds might be on this basis. As an example, such a basic study might show that the company was currently overburdened with short-term bank loans, that the bond market was the most attractive source of funds at the present time while the sale of common stock held little inducement, that the long-run capital structure should show common stock equity representing 80% of total assets, and that the average capital cost on the long-run basis would be about 11%.

With this sort of financial background established in the minds of the management, the preliminary long-range forecast is examined. Proposals which indicate rates of return below the average cost of capital are the first ones to be questioned. Even though there is no apparent need for new funds from the outside, the same measure must be applied. Cash profits, equivalent to book charges for exhaustion, can be plowed back without question, but those funds must earn as much as the facilities which they replace. Profits in excess of dividends can also be plowed back but they increase the stockholders' equity exactly as if new stock had been sold, and the owners expect at least as high a return on their increased holdings. Any proposal which does not promise more than the average cost of capital is going to need some other kind of convincing justification to win the endorsement of financial management.

The dividend forecast is then reviewed and modified by financial management on the basis of more intimate knowledge of stockholder relationships.

With these adjustments made, the impact of the long-range capital expenditure forecast can

\* Published in Technical Notes, Vol. II, No. 5, February 1954. Mr. Hill is Budget Director of the Atlantic Refining Company.



be studied. Some peaks and valleys can be removed by deferring an occasional proposal for some reasonable period. If the need for new money is of temporary duration it might be decided to finance entirely by bank loans. However, if permanent financing is required, the type must be selected and a probable schedule laid out. It is always possible that the demands for funds are in excess of what the financial management considers wise, and that may necessitate eliminating some of the least desirable proposals in order to stay within the self-imposed restriction.

Insofar as these eliminated proposals were expected to produce funds, it then becomes necessary to adjust the forecasts of net receipts and add whatever other finishing touches are required. The result is the Long-Range Forecast or the Five-Year Program, the value of which will depend entirely upon the degree of careful attention which it has received from every branch of management.

### Annual Budget

The first year of the Five-Year Program will provide the outline for the current Annual Budget. It must be understood that this outline can serve only as a general guide and not as a rigid framework into which the Annual Budget must be forced.

Operating management gives its first attention to the detailed capital expenditure forecast indicated for the current year. It starts with the list of open authorizations and their unexpended balances, each one of which requires a separate review if any significant amount of money is involved. These should be studied from the viewpoint of how much has been already spent, whether the job will be completed in the budget year, whether the total cost or the rate of return need revision, whether successful performance is contingent upon other capital expenditures not yet made, and whether its cancellation should be considered. If the rates of return, for purposes of the Annual Budget, are computed on the incremental basis of the additional investment needed to make the project operative, their relative value would be clearly demonstrated. It is not always convincing to claim that every authorized project is exempt from the screening process, when many of them could be cancelled with slight or no loss.

The other portions of the capital expenditure program then come up for scrutiny by the operating managers and are viewed largely as to their expected rate of return, whether they be replacements, improvements or additions. Each company must solve its own problem of how to prevent padding the capital expenditure budget as presented by the operating managers.

The next step in budget preparation is the close coordination of physical quantities or volumes of raw material and each product. This brings together the purchasing, producing, storing, distributing and selling functions to discover the most profitable level of operation and mix of products or points of sale. When this has been

determined each operating organization is in a position to prepare its dollar budget, based on the capital-expenditure plan and the current-volume policy which have been developed tentatively.

In preparing the Annual Budget it is necessary to go into sufficient detail to permit a close comparison with accounting records during the year. It is best to have the budget made up by months throughout the year so that a performance check and analysis of deviations may be made as currently as possible.

The capital expenditures are also going to be checked each month and they must be budgeted that way. They should be in such detail that each authorization of any significant size will appear separately in the budget so that deviations can be traced to specific jobs. The tendency to place most of the annual budget in the early months of the year seems to be just as certain as crowding most of the five-year program into the first two years, but the reason is slightly different. In the case of the annual budget, the endless stream of obstructions is not foreseen, although they always happen, and the forecast reflects what might be accomplished if everything went smoothly with no storms, no strikes, no rationing, no changes in plans, no troubles of any kind.

The forecast monthly balance sheet finally emerges as the preliminary budget is completed, and it is then ready for conference with the financial management. Any significant difference from the first year of the Five-Year Program should be explained. Then the monthly course of the cash position is followed through the budget year. The contemplated use of long-term rentals or lease-back arrangements, as a substitute for capital expenditures, is uncovered to be sure that the fixed liability burden is not going to become a major burden. Any probable changes in dividends or labor rates are debated, as to whether some cash cushion should be provided.

If the indicated demand for cash is higher than the financial management believes it can provide without some danger, there will probably be an attack on the continually growing inventory and an investigation of the large amounts of money which would be available if operating management would be willing to function with less stock on hand. Inventory is one of the unsolved problems in many industries and it is no wonder that financial management prefers to see its procured funds invested in some more lucrative manner.

When the financial officers have made their contribution and when the necessary adjustments have been made, the Annual Budget is ready for presentation to the Board of Directors for formal adoption. This establishes the pattern for comparison throughout the year by the monthly performance reports and the analysis of the deviations. However, the adoption of a budget should not be interpreted as freezing anything in a way which would force management to follow a prescribed path if some better path could be discovered. A few companies have considered the adoption of a capital expenditure budget as the equivalent of

authorization or appropriation, while the great majority continue to view the budget merely as the company's road map on which the probable course has been marked subject to change if circumstances warrant it.

### **Semi-Performance Studies**

Another form of projected capital effects has grown out of the practice of obtaining partial performance reports on capital projects. Most companies find it difficult, or even impossible, to make a thorough check on the profitability of a capital project completed a few years ago and forecast to show a substantial rate of return incrementally. The accounting is seldom designed to furnish a segregated P. & L. for the project under consideration, and the dilemma of guessing what would have happened if the capital outlay had not been made throws the problem into the realm of being just another estimate. But even on this basis it is a very stimulating exercise and it can give management some real help. It can hardly be done with the wide coverage employed in the Annual Budget, which picks up everything in the consolidated company, but it can be applied to one project after another so that a continuous sampling process is under way.

From such factual performance data as are available, coupled with the type of estimates used when the project was justified, a reasonably sound performance comparison can be produced for this early life study which might be at about five years. These first few years are the most significant and can almost tell the whole story. The study will show whether the project of five years ago has been able to stand alone and deliver its promised advantages, or whether it has had to call for further capital help in order to fulfill its

promise, or whether it has used additional help without being able to hold up its end. Whatever the pattern of the comparison proves to be, it will be highly instructive.

From the first step of the partial performance report, it is a relatively simple matter to complete the picture in the light of present day knowledge. If further capital expenditures are required to salvage the original project, and if this incremental outlay can show a good incremental return, that can be indicated for future budget use. If the project is performing even better than expected, and gives promise of a long profitable life, this knowledge can lead to other investments of similar type. If the performance is considered hopeless, it should be a deterrent to further efforts in that direction. Projecting beyond the history of the first few years can give much valuable information to operating and financial management.

### **Projection Continually**

There is something very sobering about making capital expenditures. They are committing the company to a certain line of action for a long time, which is, generally twenty to thirty years. They require large sums of money which belong to other people who expect them to be wisely used. An alert management senses these things and sees its responsibility. By constant projection into the future through the means we have been discussing, management has developed some guides to making the right decisions.

The Long-Range Forecast encourages comprehensive planning instead of random growth.

The Annual Budget permits careful screening and control before taking the actual steps.

The Performance Study aims at prompt remedial action and finer future selectivity.

## **LONG-RANGE PLANNING**

By **RUSSEL B. READ\***

In the sense used here "long-range planning" means the formulation of plans for the future development and profit improvement of a business. Within the time available, I expect to discuss principally the concepts and basic pattern which I believe to be essential to orderly and effective planning. In this respect we will be discussing more the question of "planning the planning" than the detailed mechanics and procedures involved in carrying out a planning program.

The planning ideas I will try to present are what you might call "Westinghouse-conditioned"

and to some extent will be illustrated by our practices. Since Westinghouse is a large, complex, and decentralized company the degree of emphasis placed on certain concepts may seem out of proportion to those of you in smaller or privately-owned companies where the distance between ownership and operation is not as great, and where the organization is less complex.

### **Basic Gauge of Profitability**

You have heard it said . . . many times . . . that no company can stand still. If it stops growing, it starts dying. I believe this holds true for any company and that basic planning policy must be geared to the concept of growth.

\* Presented at the National Conference, Hotel Penn-Sherwood, Philadelphia, Pennsylvania, May 20-21, 1954. Mr. Read is Planning Director of Westinghouse Electric Corporation.



But real growth is not mere expansion. The investment services define a "growth" stock as "one whose long-term trends of earnings, dividends, and market prices slant upward at a pitch faster than the corresponding trend of industrial stock averages." This definition of growth would closely correspond to the ultimate goal of sound business planning.

The purpose of such planning, then, is to direct the growth and development of the Company in such a way that the capital employed in the business now, or added later, will be used with the greatest effectiveness.

Since the purpose of any private business operation is to produce profits, the basis for their measurement is a matter of first importance. I believe there can be no argument that the only final gauge of profitability over the long-term is the relationship of the profits to the investment required to produce them. Yet the most commonly used internal basis for measuring the profit rate of a business has been the profit margin, that is, the ratio of profits to sales. I believe you will agree that operating managers, at least those below the top management, have been principally concerned with profit margins and relatively unconcerned with return on investment. This is perhaps natural in that operating managers generally have not been concerned with the acquisition of capital. Therefore they have not been inclined to include it as a consideration in the measurement of profits. This has produced the anomalous situation where those who supply the money for a business are expecting a result measured on one basis while those who employ the money are striving for a result measured on another. This can result in serious misplanning.

#### **The Investment Base**

Before we go much further it would be well to discuss the investment base to be used in computing the Return ratio. There are several ways in which return can be stated. Perhaps the one most commonly thought of is Return on Net Worth. This obviously is the return in which the investor is interested since it represents the return on his investment. But Return on Net Worth as a device for measuring operating performance is not generally useful, particularly if the operation is decentralized in management and more particularly if some of the capital is supplied by loan.

We might then look at Return on Net Resources, considering as the base the aggregate of the long-term debt and the stockholders equity. Here again the picture is not complete because of funds represented by short-term liabilities. The logical step seems to be to turn to the other side of the balance sheet and consider Total Assets as the base against which profits might be computed. Since the operating managers of the several units of a company have little control over the sources of outside capital, it seems logical that the base to be used in the measurement of their performance would be the total of the assets under their direction—regardless of the source from which the

funds were derived. This base for measurement of return also squares best with the responsibility assigned to operating managers for the profitable employment of the assets entrusted to them. It has the further advantage of stating performance in a manner which lends readily to comparison with that of other operating divisions or competitive companies. For purposes of discussion here, I will assume that total assets constitutes an acceptable investment base.

#### **The Expected Return**

Not only must the gauge of profits be clearly established, but if the planning effort is to be given real direction and focus the management must state what profit objective it expects to attain . . . what long-term performance standard has been established . . . in this case, what return on asset percentage is expected.

This, of course, is even more imperative if the operations of the company are decentralized, in order that every operating manager will understand how he will be measured and what the top management considers to be par for the course.

The basic planning approach and the basic organizational principles must be closely coordinated. Decentralization, an organizational concept to which industry is becoming increasingly committed, is not likely to operate with maximum effectiveness unless there can be created for the decentralized unit an economic climate simulating that in which the company's executive head operates. If this can be accomplished the plans and decisions made by the manager of the decentralized unit will be conditioned by many of the same pressures which bear upon the company's top management. With this economic climate established, the direction of the planning effort can be upward from the decentralized units, rather than downward from the top management.

In our case, the adoption of the return on investment criterion and the linking of our executive bonus plan to performance in terms of return on investment have contributed largely to the creation of the kind of economic atmosphere necessary to make decentralization work.

#### **Decentralized Accounting**

In the same way that management objectives and philosophies must be clear, certain internal practices must be brought into conformance with the basic concepts. In a multi-plant or multi-product situation, the effectiveness of the Return on Assets idea depends on the accuracy with which the assets and the profit applying to the particular unit can be stated.

There can be no confidence in the return ratio if the asset base is not valid. The best conceived plan that uses return on investment as an operating guide will be wrecked if the means of developing the asset base are not carefully worked out. The problems involved here will depend largely upon the extent to which the accounts, both income and asset, have been decentralized to corre-



spond with the decentralization of operating responsibility. In Westinghouse, we have gone most of the way toward decentralization and our accounting operations are decentralized accordingly. Thus, for Division A, the Division Manager is completely responsible for the profitable management of the assets of the Division, and the Accounting Manager of Division A maintains the complete books of account for the division. He prepares income statements and balance sheets in very much the same manner as an independent company would. There are a few special rules to this game, as we play it. Principally they apply to the determination of a valid cash figure on the divisional balance sheets.

In our approach to this matter, we have theoretically "capitalized" each division. In effect, each division is established as a separate financial entity so that the balance in its cash account is determined by the flow of income and outgo. Thus, its hypothetical cash account is determined by the flow of income and outgo. Its hypothetical cash account reacts to the same forces as those affecting a separate company; it is increased by net earnings, by depreciation, by loans from the corporation, or by reductions in other working capital accounts. On the other hand it is decreased by losses, by "dividends" paid to the corporation based on the capitalization of the division, by repayment of loans, or by increases in other fixed asset or working capital accounts.

In other words, a relationship is established between the operating divisions and the corporation in which the corporation is in the position of stockholder and in some cases that of creditor. It is still necessary, of course, to set minimums below which the hypothetical cash accounts of the divisions are not permitted to fall.

If you are a multi-plant or multi-product company you may find that a shift to the Return on Investment concept of measuring performance may require some rather fundamental internal policy changes—one example of this is in the matter of interdivisional shipments; for instance, castings from the foundry division which may go into the product of several other divisions.

To cite Westinghouse experience, it was long our practice to transfer such shipments at cost. We let the profit element reflect in the operating statement of the division making the ultimate sale to the customer. With the shift to Return on Investment as the measure of profits, it became obvious that the foundry manager, having no profit and no return, would soon be looking for a new job. On the other hand the assembly divisions were getting credit for profit produced by assets not charged to their operation.

It became apparent, for this and other reasons, that we should adopt a policy under which inter-unit transactions would be handled on a competitive price basis. This establishes a supplier-customer relationship in which the supplying division has to be competitive in all respects with outside suppliers. At the same time the customer division has the right to place its business else-

where if the supplying division does not measure up to competition. This has had some rather "eye-opening" results—all to the good. This policy requires some rather fancy accounting at the corporate level to eliminate interunit sales, to see that profit for the corporation is reported when the ultimate sale is made, and to assure that inventories are properly valued. But actually it is no more complex than that required on the former "cost" basis.

These and many other problems are involved in establishing reports which will accurately associate sales and profits with the assets required to produce them. But, let me assume, if you will, that the accounting techniques are available by which can be stated the sales, profits and corresponding assets of a given operating unit.

If I have taken a great deal of time in emphasizing the basic measure of profitability, it is only because I feel that no system of planning will work unless it is built upon a central concept which is clear to all concerned with the planning process.

### Planning Pattern

The framework or pattern of the planning process can be quite simple. For purposes of our discussion it might be thought of as consisting of three essential parts or steps.

On the theory that the first step in any organized planning effort is the establishment of a goal, the first step in the planning process is the setting of Long-Term Volume and Profit Objectives. These are targets or goals of performance to be reached within a certain time, in our case a five-year period. They are set for each product-line, for each division, and for the Company as a whole.

The second essential is the development of scheduled programs of action designed to improve the performance of each line from its present level of performance to that established as the long-term objective. These we might call Supporting Programs. They specify what action is required, who is responsible, and when it will be initiated and completed.

The third essential part of the process is the setting of Short-Term Objectives. They represent the planned progress for the first year in accomplishing the Supporting Programs. Obviously, if they, the Short-Term Objectives, have been set against the background of long-term objectives and programs, and they are met, it can be presumed that satisfactory progress has been made in that year toward attaining the Long-Term goals.

I would like to discuss briefly the essentials of each of these three parts of the Planning pattern.

#### Long-Term Objectives

As we practice this pattern in Westinghouse Long-Term Objectives are established by each Division for each of its product lines and for the Division in total. The sum of the Divisional objectives becomes the objective for the company as a

whole. They are intended to represent attainable goals for the fifth year in the future. For instance in 1954, long-term objectives will be set for 1959. They are set in terms of the following factors:

- Market participation (share of market)
- Sales Billed—both customer and inter-divisional
- Costs and Expenses
- Profits
- Assets required to support the volume
- Return on assets

These fifth-year goals provide the target at which the sights will be aimed. There are several criteria which can be considered in setting these goals. The Company's standard Return on Assets goal is the basic yardstick. Other criteria could be the performance of best competitors in corresponding lines of business, or the best rate of performance in earlier years. While the yardsticks may vary, the objectives should always represent excellence in performance.

Instructions, forms and schedules for the development and presentation of these objectives are prescribed to assure reasonable uniformity in method and underlying precepts. For purposes of this discussion it is unnecessary to describe these in detail, but some of the principles which govern the setting of long-term objectives should be mentioned because of their fundamental nature.

First, why are these objectives set for the fifth year ahead? Generally speaking, less than five years often provides too short a period of time for carrying out the underlying programs necessary to achieve the objectives. On the other hand, projections beyond five years—while interesting and sometimes necessary in proposals involving new plants, generally serve no useful purpose and are too nebulous for sound planning.

Even a five-year pattern should be revised each year to reflect new circumstances developing in the market and the product. Plans without a high degree of flexibility run a great risk of subsequent abandonment.

A second question is whether the volume projections should be on a trend basis or a cyclical basis. Our program specifies the trend basis, on the theory that such projections will be (and have been in the past) much more accurate than those based on guesses involving frequency and depth of the cyclical swings. Further, the long-term development of a business should be keyed to long-term movements to avoid the serious loss of market position that can result from bad cyclical guesses. This policy is based on the belief that reasonable periods of idle plant capacity will be far less costly than the loss of basic competitive status. This does not mean that provision should not be made for the short-term to reflect the retrenchment actions required to weather the low points in the cycle.

I will not attempt to discuss the techniques for determining the trend of the market for a particular product. But for a great many products

industry statistics are available for past years and a trend projection can be made without great difficulty.

Since the objectives are expressed in terms of dollars, or ratios in which dollars are involved in the computations, the question arises as whether future price levels or wage levels should be estimated. In our ground rules we use existing price levels, that is we assume no change in the future value of the dollar. While this may prove to be untrue, the figures are more readily understood and interpreted than would be the case if inflationary or deflationary pressures were projected. Since the objectives are systematically revised, any correction in this respect is automatically picked up in the next annual revision.

There are other lesser assumptions and rules of procedure in the setting of the Long-Term goals but we need not discuss them here.

### Supporting Programs

The second step in the planning pattern, and the most important, is the development of specific courses of action designed to accomplish the objectives. These have been called Supporting Programs. They are the specific, scheduled, major, plans of action to improve the business from its present level of performance to that stated in the long-term objectives. They should identify and define the problems to be overcome, what action is planned, who is responsible, and when it will be initiated and completed.

A Supporting Program as used in this sense is not defined as covering all of the more-or-less routine, taken-for-granted, things that all good organizations do. It is limited to important existing and new programs which are designed to improve the performance, not merely maintain it at its present level. The aim of the support programming effort is to develop a series of specific projects for execution which, in the aggregate, will assure that the objectives are attainable. In short, the long-term objectives, set as the first step in the process, is the target—the Supporting Programs are the specific plans to reach this target.

Generally speaking, when it is possible to do so, the programming problem should be attacked by product line. The more it can be narrowed to product line, the more specific and effective it will be.

In charting the profit-improvement course, it will be found that the Return-on-Assets concept, discussed at the outset, has great usefulness. The use of this ratio as a prime device for planning and improving an operation will be enhanced if its determining factors are examined. The basic return-on-assets equation possesses a significance often overlooked because it is so elementary and obvious. It is this:

Return on Assets = Profit Margin  $\times$  Turnover  
or more specifically:

$$\frac{\% \text{ Profit to Total Assets}}{\text{Total Assets}} = \frac{\text{Profit}}{\text{Sales Billed}} \times \frac{\text{Sales Billed}}{\text{Total Assets}}$$



Sales, costs and assets then become the three factors in the business equation—the eternal triangle of business. Sound planning and successful operation must point toward the optimum combination of these three factors to produce the best return on investment.

Obviously, the combination will and should vary depending upon the character of the product. Heavy apparatus, tailor-made to the customer's specifications and requiring long lead times, will generally require relatively more assets but should produce a higher margin. On the other hand, mass production of highly competitive consumer goods should be planned for high turnover because competition will not permit such lines to show a large margin. It follows therefore that in multi-product companies, where the types of operations differ between products, goals and standards for turnover and margin cannot in all cases be uniform. The standards must reflect the fact that, because of inherent characteristics, product lines will and should vary in performance with respect to margin and turnover.

The relationship can be converted to concrete, though flexible, terms as illustrated in the chart (Exhibit 1). The chart shows graphically the combinations of profit margin and asset turnover which must be achieved to produce, in this case, a 20% return on assets. I am using the term "margin" for this purpose as meaning "% operating profit to sales billed." As you will see, margin appears on the horizontal scale, turnover on the vertical. For instance, with a turnover of 1, a margin of 20% would be required to produce the 20% return on assets; with a turnover of 1.5, a margin of 13.3 would be required; with a turnover of 2, a margin of 10% would do the trick, and so on.

In a multi-product situation the expression of return on investment in terms of its two factors—margin and turnover—not only has the advantage of flexibility in appraising profit performance; it offers an approach by which performance can be analyzed and programmed for improvement.

For instance, top management can easily compare the company's performance with competitors (where published figures are available), and divisional or product managements can make similar comparisons with other divisions and products of the company, and with specialized competitors in comparable lines of business. Where the comparison is expressed in terms of the two factors—margin and turnover—it may reveal or at least indicate the approach to be taken in planning the improvement of those lines which are lagging.

This is exemplified by reference to the hypothetical product line comparison illustrated on the next chart (Exhibit 2). As one example, look at Division J:

Division J has a substandard asset return performance of 16%. (This is measured by the linear distance from the dot plotted for Division A and the curve representing the company standard,

which in this case is drawn at a 20% operating profit return on assets.) In considering how it can work toward a more satisfactory return, the division manager is impressed by the fact that Division L, with operating and product characteristics very similar to his own, produces a return in excess of the company standard. He notices that the two divisions enjoy almost identical margins. However, his over-all result is depressed almost entirely by a lower asset turnover (a rate of 1.00 compared to 1.60 for Division L). By further analysis he discovers that this deficiency stems almost entirely from the relative inventory turnovers of the two divisions. This leads him into a comprehensive study of inventory levels and controls. From this he concludes that his inventory excess is primarily the result of two things: (1) a number of low profit items which in the aggregate constitute a considerable portion of his finished product inventories but a very small percentage of his sales; and (2) a number of profitable but relatively slow-moving items which are stocked in all of his field locations. As a result of this survey, he decides to concentrate on increasing his asset turnover from 1.00 to 1.25 and to aim toward a small improvement in margin from 16% to 17%. If this is achieved it will put his division well over the asset return standard and well over the current performance of Division L. He plans to attain the improvement in asset turnover through increased turnover of inventories, through "weeding" his product lines of the items which are spoiling his profit return, and by consolidating field stocks of slow-selling items.

If you will subscribe to the idea that profit performance can be diagnosed more readily by examining the business in terms of both margin and turnover let me move a step further into planning the operation for improved return on investment performance.

If return on investment has been established as the key objective, and if it has been expressed in terms of specific profit margin and asset turnover goals for each product line, it becomes apparent that the marketing, engineering, and manufacturing programs in support of these objectives must necessarily be directed at one of the following:

- To increase volume
- To increase margin by reducing the cost ratios, or
- To minimize assets in relation to volume.

With performance goals for each of these three factors established, the gap between present performance and the goal can be quantitatively expressed for each factor. With the profit improvement goal expressed in these definite terms, actions necessary to close the gap can be planned with increased focus.

Obviously, all of these sources of improved performance are inter-related in their effect upon each other. Further, the coordinated activity of the three main functions—Marketing, Engineering, and Manufacturing—is generally necessary



EXHIBIT 1

## RELATIONSHIP BETWEEN PROFIT MARGINS AND ASSET TURNOVER

(AT 20% STANDARD OPERATING PROFIT TO TOTAL ASSETS)

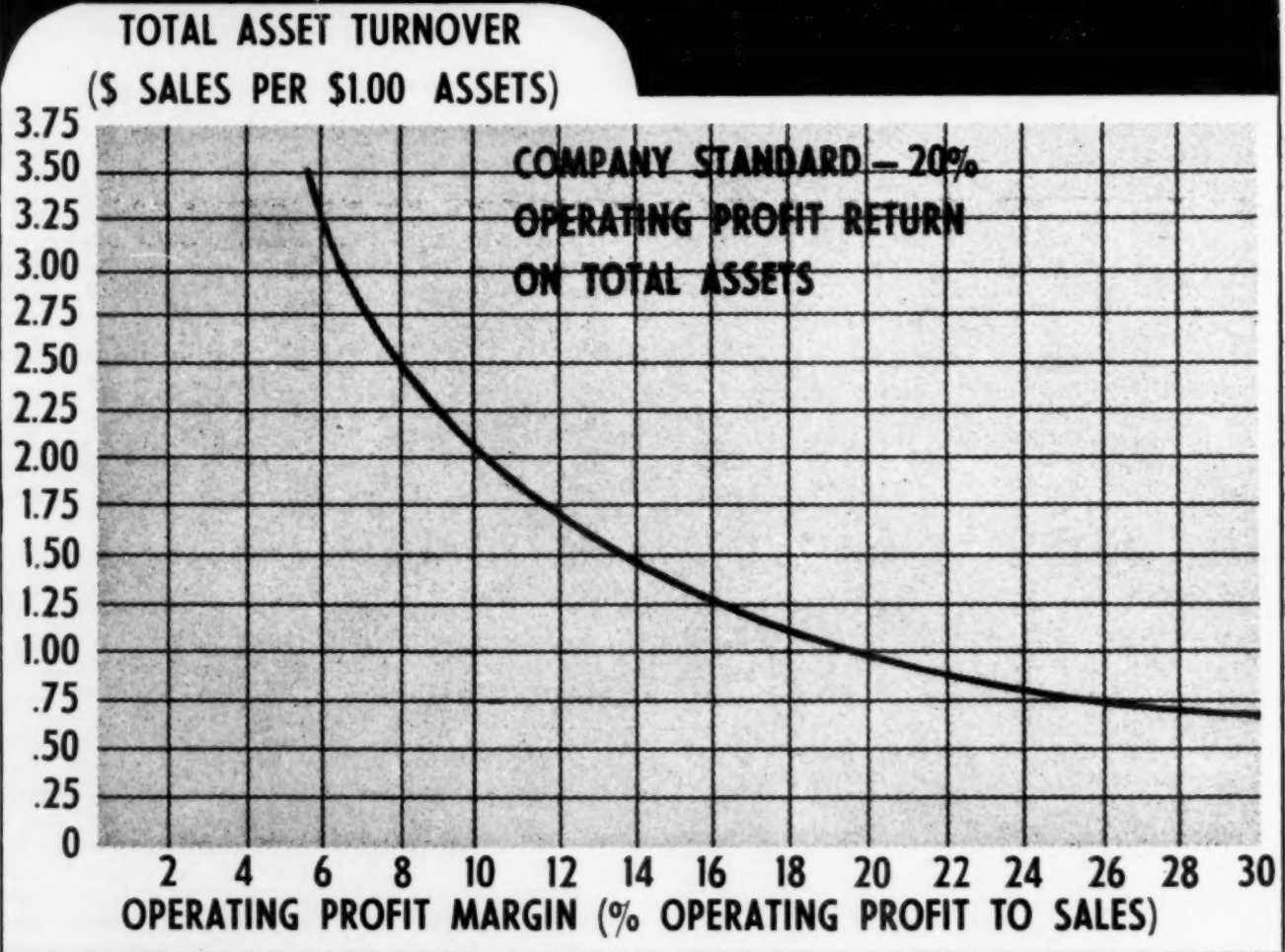
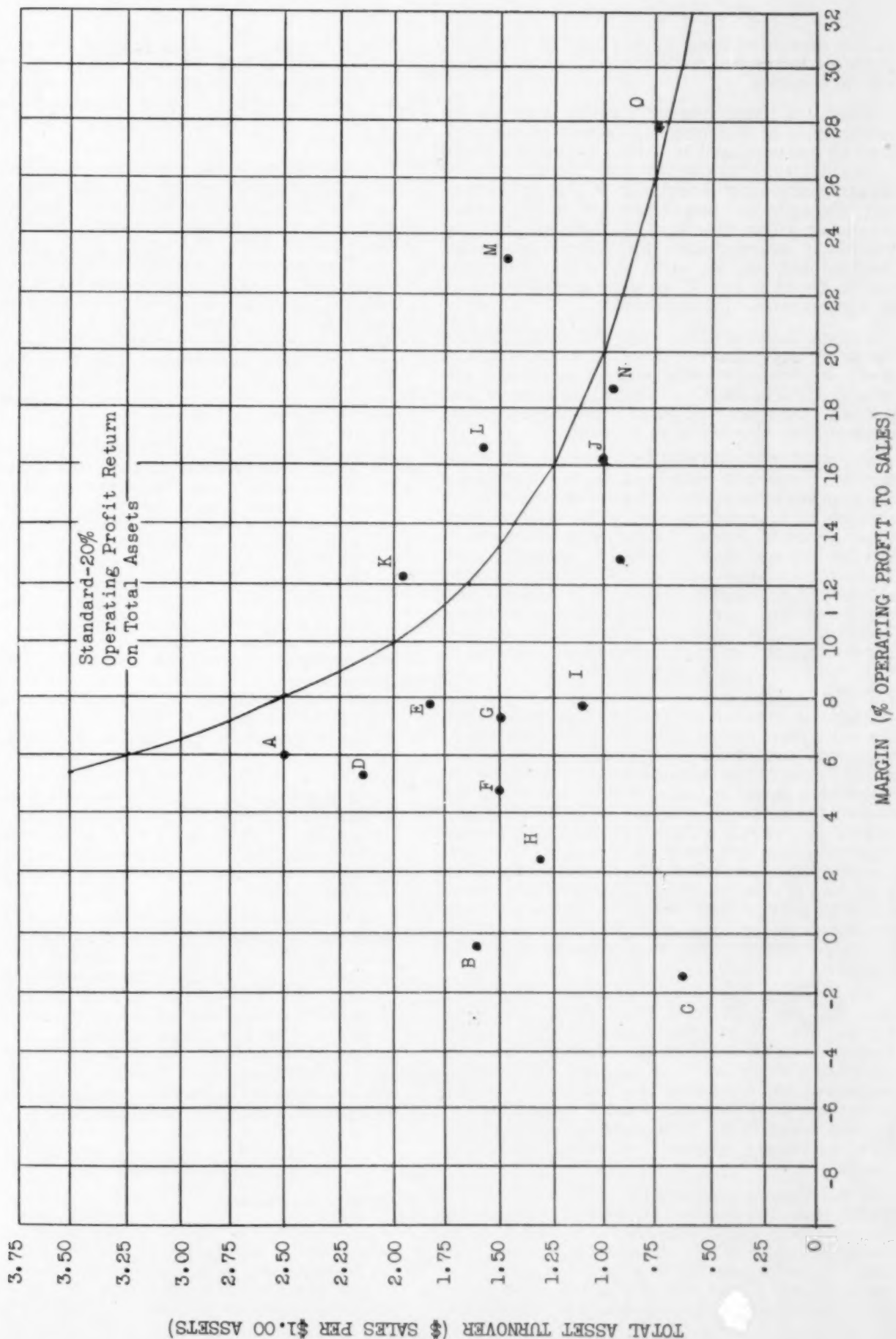


EXHIBIT 2  
PROFIT MARGINS AND ASSET TURNOVERS BY PRODUCT LINES



to the accomplishment of any one of the three purposes mentioned with respect to the product line in question.

The block chart, marked Exhibit 3, shows the relationship of the principal factors of performance by purpose, and identified to the functional responsibility. The dotted line blocks indicate factors pertaining essentially to the product itself; the solid line blocks those pertaining to the operating effectiveness of the department involved. It oversimplifies the inter-relationships involved but may serve to show how programs can be aimed at one of the three means by which performance can be improved.

I think that the sales, engineering, and manufacturing programs developed in support of the profit improvement plan will be materially improved in focus and in timing if each one is consciously identified with one of these three methods of improving the return on investment.

For instance, referring to the chart, the Engineering Product Development funds available for the year might be spent with greater impact if the projects in the program are identified as between those aimed at improving the competitiveness of the product and those intended to reduce its cost. If the particular problem of the product line is the attainment of greater volume, it is possible that cost reduction projects should be temporarily deferred so that the efforts of all available engineering manpower can be directed at the purpose of improving the customer acceptability of the product.

There is another advantage of working from the basic asset return equation in the planning of improved performance. If specific programs are aimed at one of the three elements of the equation, it becomes easier to evaluate their impact on the overall performance, thus assuring that the programs are closely meshed to the performance objectives they are designed to support. We have found this to be particularly effective in the planning and evaluation of facilities projects, where every project is classified as to its purpose and evaluated in the light of estimated benefits expected to result from accomplishment of the purpose.

To illustrate the process generally, let me ask that you scan the third sheet which you have, marked Exhibit 4. This is an illustrative list of factors to be analyzed by the functional heads in connection with each of the several possible sources of improved profit performance. You will notice that these factors are listed under headings corresponding to the three elements of the return on investment equation — volume, costs, and assets.

A technique in planning for profit improvement might take this form: (1) define quantitatively the gap which exists with respect to each of three elements between performance at present and that represented by the long-term objective; (2) examine each of the detailed factors listed to define the problem, if any, which exists; (3) formu-

late a specific, scheduled program of action for each, and then (4) evaluate the planned results of each project in terms of effect upon the income and asset accounts. This is illustrated generally in Exhibit 5, the last page in the group of exhibits which you have.

In this example the improvement in before-tax profit is programmed at \$140,000 with \$50,000 derived from increased volume and \$90,000 from cost reductions, thus raising the profit margin from 10% to 20%. The asset base is projected at the same amount as present, with a \$100,000 reduction of inventories programmed to offset an \$80,000 increase in equipment for cost reductions and a \$20,000 increase in other working capital. Thus, the asset turnover at the higher rate of projected sales is increased from 1. to 1.2 times. This, combined with the improved profit margin, increases the before-tax return on assets from 10% to 24%.

This seemingly tedious process of programming the profit improvement of each line in terms of the three elements in the return on investment equation is not necessarily as painful as might appear at first thought. Presumably, if the Company is healthy most of the lines are already on the beam and existing plans will be sufficient to keep them that way. But for those lines which are "sick," the approach offers a means of diagnosis.

The third essential part of the planning pattern involves the linking of long-term objectives and supporting programs to an immediate short-term, annual budget which can serve as the medium for measuring performance. The Annual Budget translates in terms of dollars the one-year impact of the programs designed for the accomplishment of long-term objectives. It expresses the planned results for the first year. Therefore, set against the background of long-term objectives and programs, the Annual Budget becomes the control device for measuring current performance. If performance equals or exceeds this budget, presumably the progress toward long-term goals is also satisfactory.

In addition to reflecting the results of planned programs of action, the Annual Budget is the instrument in which can be reflected all of the immediately predictable circumstances. Expected cyclical variations in volume from the trend with the resulting effect on fixed and variable cost relationships would be incorporated in the annual budget. Similarly, such matters as extraordinary or non-recurring items of expense, which would not be found in the long-term projections, can be recognized in the one-year budget.

## Conclusion

### Initiative for Planning

I would like to speak briefly concerning the responsibility and initiative for planning within an organization. Wherever possible, the direction of the planning process should be upward, not downward. Within the framework of overall com-



**EXHIBIT 3**  
**PRODUCT PLANS**

<u>RESPONSIBILITY</u>	<u>PURPOSE</u>		
	<u>VOLUME</u>	<u>COSTS</u>	<u>ASSETS</u>
<b>ENGINEERING</b>	<div>Competitiveness Performance Selling Features</div>	<div>Low Cost Design</div>	
<b>SALES</b>	<div>Effective Marketing Market Analysis Sales, Advertising &amp; Promotion</div>		<div>Simplification of Line</div> <div>Inventory Control</div>
<b>MANUFACTURING</b>	<div>Competitiveness Workmanship Delivery</div>	<div>Control of Costs Labor Material</div>	<div>Control of Assets Inventory Control Utilization of Fixed Assets</div>
<div> <div>---</div> Product Programs <div>—</div> Operational Programs </div>			

**EXHIBIT 4**  
**FACTORS AFFECTING RETURN ON ASSET PERFORMANCE**

**I. INCREASED VOLUME**

**A. Competitiveness of product**

1. Price
2. Breadth of line
3. Functional performance
4. Design and feature
5. Quality
6. Delivery
7. Service

**B. Marketing effectiveness**

1. Sales organization
2. Distribution
3. Dealerships
4. Field inventories
5. Advertising and promotion

**II. REDUCED COSTS**

**A. Design**

1. Simplicity
2. Standardization
3. Interchangeable components

**B. Cost reduction**

1. Labor saving equipment
2. Simplified processes
3. Segregation of standard and special designs
4. Layout
5. Wage and expense control
6. Material costs

**III. MINIMIZATION OF ASSETS**

**A. Product line simplification**

1. Standardization
2. Item combinations
3. Elimination of low activity items

**B. Asset Control**

1. Inventory control
2. Material flow
3. Management of field stocks
4. Space utilization
5. Equipment utilization

**EXHIBIT 5**  
**EFFECT OF PLANNED PROGRAMS**

	<u>PRESENT</u>		<u>CHANGE BY</u> <u>VOLUME</u>	<u>CHANGE BY</u> <u>COST REDUCTION</u>	<u>ASSET</u> <u>CURTAILMENT</u>	<u>FUTURE</u>	
	<u>\$</u>	<u>%*</u>	<u>\$</u>	<u>\$</u>	<u>\$</u>	<u>\$</u>	<u>%*</u>
<u>PROFITS</u>							
Sales billed	1,000,000	100.0	+200,000	-	-	1,200,000	100.0
Manufacturing cost	770,000	77.0	+140,000	-88,000	-	822,000	68.5
Distribution expense	50,000	5.0	+ 4,000	-	-	54,000	4.5
Engineering expense	50,000	5.0	+ 6,000	-	-	56,000	4.7
Administrative expense	30,000	3.0	-	- 2,000	-	28,000	2.3
Profit (before taxes)	100,000	10.0	+ 50,000	+90,000	-	240,000	20.0

\* per cent to sales billed

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<u>ASSETS</u>						
Inventory	500,000	-	-	-100,000	400,000	
Other Working Capital	200,000	+ 20,000	-	-	220,000	
Fixed Assets	300,000	-	+80,000	-	380,000	
Total	1,000,000	+ 20,000	+80,000	-100,000	1,000,000	

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RETURN ON ASSETS

Profit Margin (%)	10.0	20.0
Asset Turnover (times)	1.00	1.20
Return on Assets (%)	10.0	24.00

pany objectives and policies, the specific plans for each unit of the company should be developed by those responsible for carrying them out. Obviously the degree of formalization of planning will depend quite largely on the complexity of the company. In Westinghouse, with some one hundred product lines manufactured in thirty-five separate operating divisions, it is necessary to state the ground rules and prescribe the procedures in some detail. There is a Headquarters Planning Committee, composed of key company staff officers, but its role is one of coordination. It develops and administers the framework and establishes standards within which plans can be developed by the divisions in an orderly process. But the responsibility for developing objectives and laying out the

programs to assure their attainment rests with the managers of the decentralized units.

#### Summary

In concluding, I would stress these matters: (1) the importance of a soundly conceived, company-wide framework of planning within which well defined policies and objectives are established; (2) the force which can generate from a decentralized organization in which the direction of planning is upward from the product line, not downward; and (3), the focus and direction offered by an approach in which the activities of Engineering, Sales and Manufacturing are all focused toward the single minded purpose of Return on Investment.



## 2. REPORTING AND PERFORMANCE ANALYSIS

### A METHOD OF REPORTING ACCOUNTING DATA FOR PURPOSES OF PLANNING AND CONTROLLING PERFORMANCE

(With Reference to the Accounts of an Integrated Oil Company)

By JIM G. ASHBURNE\*

#### General

1. In scheduling and appraising operations, a measurement of the net effect on working capital assets used is proposed, rather than theoretical net income before income taxes. Objectives and features of this concept are as follows:

- a. The objective of a segment is to generate working capital assets, or to consume a minimum of such assets in fulfilling its mission.
  - b. Executive and supervisory managers are judged by results achieved, for only revenues and costs which can be traced to the operation for which they are responsible are credited or charged to them. In general, the lower the level of management, the fewer the charges; prorrations are practically eliminated.
  - c. All levels of management think of *control* as a means of maximizing the liquid capital available to the company.
  - d. The fact of interdependence—of working for a common goal—is fostered and a more realistic picture of relative importance of segments is obtained.
  - e. Thinking in terms of accounting net income is concentrated at the level of general management where it is relevant.
  - f. Traced costs may be broken into those which can be controlled by the particular executive or supervisor and those not subject to his control, but in any case he is not loaded with portions of expenses subjectively determined and allocated.
  - g. Internal performance reports may be prepared with greater dispatch and the lag between the event and managerial recognition and action will be reduced.
2. Revenues are credited to the segment producing them.
- a. Production (leases, fields, districts, regions, and divisions) with value of oil or gas lifted.
  - b. Manufacturing (gas plants and refineries) with realizable value of products made available for shipment or sale.

- c. Marketing (districts, regions, and divisions) with a standard margin deducted in (b).
- d. "Productive" service departments where an established price for the service is available (steam plants, maintenance, tabulating) and where their service can be charged to other segments on a job basis—value of jobs done.
- e. Other service departments—revenue (or contra expense) is considered to be the amount by which income taxes are reduced by reason of deductible departmental expenses.

3. Only expenses which can be traced to the segment and which represent current outlays of assets are charged to it.

#### Segment Productivity

Consistent application of any reporting method permits some kind of comparison of performance of company's segments. Similarly, management can effect some degree of control irrespective of the amount or kind of data supplied to it—or even without any accounting information. The ideal of statistical reporting is to promote the greatest degree of control with the minimum data and at the lowest possible cost. The comptroller's battle is to reduce the volume without impairing the effectiveness of management. And, incidentally, while management puts the pressure on the comptroller to reduce costs, often it is management itself which prevents reductions in the volume or cost of accounting work.

Company management at present plans and appraises segment performance as well as that of the integrated company, on the basis of "net income before taxes." Use of this traditional measure reflects the assumption that company segments should be judged as independent enterprises and the further assumption that income taxes are distributions of income rather than costs of doing business. The position taken herein is that the first is questionable and the second, false.

In the first place, a segment of an integrated company cannot earn a net income. It is not fully equipped to do so. In acknowledgement of this fact, internal profit analyses are conspicuously labelled "theoretical" net income, or profit and

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loss reports. While there is no harm in indulging fictitious concepts which increase utility or comprehension, there is no particular virtue in perpetuating a fancy when a more realistic measure, with sounder premises, is at hand.

#### Net Contribution Analysis

This measure is difficult to name if confusion with customary accounting terminology is to be avoided. The actuality of segment interdependence is clear, however. Net income, in the accounting sense, cannot be earned by a segment of an integrated corporation, but only by the corporate entity. True, the accounting entity concept is flexible and can be interpreted to rationalize the orthodox net profit analysis for segments which have counterparts operating as independent enterprises. It seems more accurate, however, if the concepts used describe what is. The truth of corporate integration is that while the operations and organization are broken down into compartments where specialization makes for efficiency, something is reserved for general management, and each segment is furnished with something less than it would have as a separate enterprise.

The value of having management at all levels thinking in similar patterns is real and significant. This is perhaps the best argument for "net income" reporting, in fact. The measure suggested here, however, seems to guarantee the benefits obtained from consistent thought patterns and at the same time eliminate the element of artificiality present in "net income" thinking. It is readily adjusted to yield a net income figure whenever net income is relevant to the particular purpose or use of the analysis.

The best name for the measure seems to be "net contribution to" or "net drain on working capital assets." The use of "treasury" or "working capital" alone causes some confusion because of accounting definitions. "Operating assets" is sometimes used, as is the accounting caption "current assets."

The concept represented is that an enterprise has two capital funds:

1. A more or less fixed fund which is tied up in facilities necessary to a given economic operation and useful for relatively long periods, and
2. A circulating fund required by the economics of employing these facilities to create goods or services.

The second fund is of more immediate concern to management. From this fund cash must be obtained to meet the financial obligations to employees, creditors, and owners, as well as to acquire the materials and services incident to production and distribution. In recent years, corporate management has expected this fund to grow at such a rate that transfers can be made to the fixed fund to permit replacement of uneconomic facilities and expansion of plant capacity.

The continuing importance of the size and liquidity of this circulating fund is such that all members of management should be aware of the impact which their function has on the growth of this circulating capital. Their plans should be pointed toward the optimum results with respect to working capital assets and their performance judged on the basis of actual effect on these same assets. Each employee, in fact, should have this consciousness of working capital assets.

#### Comparison With "Net Income" Analysis

Apparently, it is a similar objective which leads to the "net income" analysis for appraising segments. "Net contribution" analysis coincides with "net income" analysis down to a point.

*Revenue.* The measurement of the gross contribution or revenue, of a segment is the same for both methods. Any segment which produces goods or services or adds to the value of products theoretically has revenue. As a practical matter, ease of valuing the products or the increase determines the extent to which revenue is actually credited to the segment.

The production division poses no particular problem, for the exchange value of a barrel of crude or Mcf of gas is available in the form of a posted price. The value added by the manufacturing division can be measured, too, for competitive prices or contract prices are established for most products of refinery and gas plant processes. Marketing divisions sell products at established prices. The method used by the company for distinguishing marketing and manufacturing revenue is sound and precise enough for all practical purposes.

Service departments and administrative functions present a problem. When the value of the products or service performed can be readily ascertained by reference to alternative purchase of the same service from outside organizations, revenue can be measured and credited to the segment. Otherwise, the management objective becomes the unilateral one of diminishing the drain on working capital assets.

In only one aspect does the revenue measurement of the two methods differ. The use of "net income before tax" in performance reports implies, as was stated earlier, that income taxes are conceived of as a distribution of income rather than a cost of doing business. In view of the fact that every revenue dollar, regardless of source, is subject to an income tax charge and because the charge is material and apparently will continue to be so, such a concept seems to cultivate dangerous habits in managerial thinking. Most decisions have important tax aspects, and management should be much more conscious of tax implications than of theoretical net income consequences. To incorporate tax consciousness in the regular reporting procedures and in their normal interpretation, the "net contribution" analysis recognizes the tax effect of all revenues and all outlays and deductible expenses. Revenue-producing departments bear the income tax deduction before showing a



net contribution to working capital assets. Even service departments derive a revenue (or a reduction of expense) by virtue of providing expense items which may be deducted in computing income tax liability. Any deduction admissible for tax purposes, even though it does not occasion the expenditure of current working capital assets, reduces the amount of assets dedicated to payment of income tax. Instead of yielding new revenues, they decrease the outflow of cash for taxes, and company working capital is greater to that extent.

A segment of an integrated company can contribute to the company's circulating capital, therefore, by:

1. making new economic goods or services available for use, as in producing operations, or
2. adding to the exchange value of economic goods owned or acquired by the company, as in gas plant and refinery operations, or
3. furnishing income tax deductions and thereby reducing the outlay for payment of taxes.

*Costs and Expenses.* Expense reporting under the "net contribution" concept differs from that found in analyses oriented to and dictated by conventions of financial accounting. Accounting "net income" is a residual which purports to show the number of dollars of revenue which may be distributed, at the discretion of ownership or trustees, without impairing the invested capital. Whether it should continue to reflect distributable earnings or should be converted to a measure of real wealth is a moot question which is not relevant to the discussion of controlling performance. What is alleged here is that accounting net income is not the critical figure for comparing segment performance; it is instead a measure of accretion to the composite corporate entity, useful in dividend decisions and other distribution problems.

"Net income before tax" is neither fish nor fowl; it is inferior to both accounting net income and net contribution. It disregards a significant prior claim upon corporate assets (income tax) and thus falls short of reflecting accounting net income. On the other hand, it recognizes certain accounting conventions which take it beyond net contribution and distorts the picture of comparative profitability as follows:

To compute the net contribution or drain on working capital assets, only current outlays are deducted from segment revenues. Accounting charges which do not require funds (depreciation, depletion, and amortization) are reflected in performance reports only in the income tax expense, which, having been computed according to tax law, consequently is smaller by virtue of the deduction of these capital charges.

These so-called expenses have no effect whatsoever on the inflow of revenues, or the quantity of working capital assets subject to control and management. When the problem is that of determining the size of the dividend distribution,

the orthodox net income analysis is appropriate. In the regular internal reports, management's attention is centered on the size of the circulating capital fund and the effect of decisions on this fund.

Finally, the reader must understand that out-of-pocket expenses have two other dimensions which must be taken into consideration. The first of these dimensions is *traceability*.

The nature of expenses and costs is such that some items can be traced to the smallest segment and to the individual product; by far the majority of items can be traced only part of the way—to departments but not to sections, to divisions but not to departments, to functions but not to divisions.

Now, absorption cost procedure requires that each cost element be forcibly carried to the smallest unit and ultimately to products. Actually, all organizations shrink from the complete effectuation of this program and exclude some or many items to which they refer as administrative or overhead. But orthodox internal reporting reflects a welter of allocations and assignments often made just to carry out the spirit of absorption-cost law—to make each segment bear its "fair share."

Much of this exorcising is waste motion insofar as control of performance is concerned. Except for purposes of pricing, most allocations are unnecessary. Use of them for pricing is itself based upon the questionable premise that cost, thus artificially developed, is a primary factor in setting prices. Even where this reasoning is accurate, product cost analysis has limited usefulness in controlling operations.

Again, "net contribution" analysis respects the actual interdependence and independence of segments. The integrated company may be likened to a nest of boxes, each of which may itself be nested. The bigger the segment, the more it resembles a self-sufficient enterprise, but there is actually only one such—the integrated company. It may be appraised by the net income it produces. The components, however, should be appraised on the basis of revenues and costs traceable to them, not on the basis of arbitrary charges, especially arbitrary charges which cannot be controlled by supervisors of the particular component. The hypothetical question "What would the segment have made (or cost) if it were a separate business?" is academic, and yet, most accounting reports attempt to answer it. Here we find business men who pride themselves on practicality dealing with a highly theoretical measure.

The "net contribution" analysis attempts to set out the answer to the question "What did this segment add to (or take from) the funds subject to reinvestment or available for liquidating the company debt?" The aim is to show the benefit accruing to the integrated company by virtue of carrying out each operation.

*Illustrative Examples.* To illustrate the reporting method, condensed reports using hypothetical figures are presented below.



The company income statement would appear something like Exhibit 1.

The report to be used at the divisional level is a supporting schedule of the type shown in Schedule A. The divisional report in turn is supported by separate reports for each refinery, illustrated in Schedule A-1. These reports include only traceable expenses for which the refinery manager is accountable. Refinery operations finally are supported by schedules for each process or plant, as illustrated by the two plant reports in the Schedules A-19 and A-15.

The operations may be combined on a product basis to the extent that runs and costs may be traced to products. Schedule A1-a illustrates a product schedule based on the assumption that the items are traceable. It should be understood that this is a supplementary analysis.

The analysis of administrative departments is illustrated in summary form as shown in Schedule B.

A great advantage of net contribution analysis is that reports reflect people, not technical functions with divided responsibilities. They are additive; reports are combined to correspond with the

organization chart. They permit costs to appear at the appropriate level of management.

A further analysis, not illustrated, may be introduced into the performance reports to reflect the other dimension of costs mentioned earlier—controllability. This simply requires a division of expenditures into two sections of the control report:

- A. Those which can be controlled by the supervisor and
- B. Those which are traceable to the operation but not controllable by its supervisor.

“Net income” analysis has the support of precedent and habit. It has some logical defense. “Net contribution” analysis, however, seems to portray truth—to describe the actual situation—and should be even more useful to operating management than the analysis now set before them. It is not a radical departure, and the change-over should be painless and of short duration. It is compatible with break-even analysis, which is of increasing interest to industrial management.

## EXHIBIT 1

### U. S. OIL COMPANY—INCOME STATEMENT

Month of August, 1953

		\$000
Additions to Working Capital Assets:		
Production Division.....	xxx	
Manufacturing Division.....	2,676	
Marketing Division.....	xxx	
Transportation Services.....	xxx	
Other.....	xxx	
Gross Increase in Working Capital Assets.....		xxx
Expenditures of Working Capital Assets not traceable to Divisions and not capitalized:		
Administrative Department (detailed by sub-departments).....	xxx	
Interest.....	xxx	xxx
Net Increase in Working Capital Assets.....		xxx
Accounting Charges not affecting Working Capital Assets		
Depreciation, Depletion, and Amortization.....	xxx	
Abandonments.....	xxx	xxx
Net Income for the month.....		xxx

# SCHEDULE A

## U. S. OIL COMPANY—MANUFACTURING DIVISION NET CONTRIBUTION TO WORKING CAPITAL ASSETS

Month of August, 1953

		\$000
Additions to Working Capital Assets:		
Refinery A.....		1,074
Refinery B.....		1,868a
Gross.....		2,942
Expenditures of Working Capital Assets not traceable to refineries:		
Home Office Administration.....	151	
Research and Development.....	303	
Other.....	100b	
Income Tax Credit.....	554	
	288	266
Net Contribution to Working Capital Assets.....		2,676
Memo:		
Accounting charges not affecting Working Capital Assets:		
Depreciation, Depletion, and Amortization.....		615
Other.....		xxx
Total.....		615
Theoretical Net Income.....		2,061

- a. Approximated by using ratio of contribution and theoretical net income before tax of refinery A (February, 1953)  
b. Amount of depreciation in this figure not known.

# SCHEDULE A1

## U. S. OIL COMPANY—REFINERY A NET CONTRIBUTION TO WORKING CAPITAL ASSETS

Month of August, 1953

		\$000
Additions to Working Capital Assets:		
Products at net-back value.....		19,354
Expenditures of Working Capital Assets:		
Crudes.....	12,880	
Oil Storage.....	157	
Other Charge Stocks.....	1,171	
Labor, etc.....	3,309	17,517
Income Tax Charge.....		1,837
Brought Down.....	1,837	
Depreciation, Depletion, and Amortization.....	369	
Taxable @ 52%.....	1,468	763
Net Contribution to Working Capital Assets.....		1,074
Memo:		
Management Charges:		
Home Office Administration.....	121	
Research and Development.....	242	
Other.....	80	443
Net Contribution after Management Charges.....		631

# SCHEDULE A1-9

U. S. OIL COMPANY—REFINERY A

PLANT 9

August, 1953

		\$000
Working Capital Assets Produced:		
Product Yield at net-back value		806
Charge Stocks at net-back value		730
Value Added		76
Expenditure of Working Capital Assets (detailed)		30
Income Tax Charge on Revenue	46	46
Less Depreciation, Depletion, and Amortization	2	
Taxable @ 52%	44	23
Net Contribution to Working Capital Assets		23

# SCHEDULE A1-15

U. S. OIL COMPANY—REFINERY A

PLANT 15

August, 1953

		\$000
Additions to Working Capital Assets		17
Expenditures of Working Capital Assets:		
Charge Stocks	15	
Expenses (detailed)	257	272
		(255)
Income Tax Credit		
Brought Down	(255)	
Add Depreciation, Depletion, and Amortization	( 3)	
Credit of 52%	(258)	134
Net Drain on Working Capital Assets		121

# SCHEDULE A1-a

U. S. OIL COMPANY—REFINERY A

NET CONTRIBUTION OF WORKING CAPITAL ASSETS FROM GASOLINE OPERATIONS

Month of August, 1953

		\$000
Additions to Working Capital Assets:		13,899
Expenditures of Working Capital Assets:		
Crudes	9,123	
Storage	111	
Other Materials	1,087	
Labor and Other Expenses	2,206	12,527
		1,372
Income Tax Charge		
Brought Down	1,372	
Less Depreciation, Depletion, and Amortization	246	
Taxable @ 52%	1,126	586
Net Contribution to Working Capital Assets		786



## SCHEDULE B

U. S. OIL COMPANY—ADMINISTRATIVE—PURCHASING DEPARTMENT

### NET DRAIN ON WORKING CAPITAL ASSETS

Month of August, 1953

	\$000
Expenditures of Working Capital Assets:.....	495
Income Tax Credit	
Brought Down.....	494.7
Add Depreciation, Depletion, and Amortization.....	.7
Taxable @ 52%.....	495.4      258
Net Drain on Working Capital Assets.....	237

## MEASURING EXECUTIVE PERFORMANCE

By RICHARD F. NEUSCHEL\*

Whenever a group like this gathers together to refine its art, so to speak, or to exchange information about its techniques, the time always seems appropriate to back away and take a look at some of the broader aspects of the activity under consideration. You see, no matter what kind of work happens to be our own particular daily concern, as we analyze it and talk about it, it is often useful to think for a moment about its basic purpose, its relationship with other activities and how it fits in with the broader scheme of things. That is essentially what I would like to try to do for a few moments here today. That is, I would like to consider with you, if we may, just where budgeting fits into the whole administrative process and what are some of the pressing current problems in the broad area of which budgeting is a distinct part.

### Three Developments

First, however, I would like to digress a minute if I may. In order to provide something of a background against which to project our thinking, I would like to talk with you for a moment about some of the things that, as we see it, are uppermost in management's mind today. In the experience of myself and my associates in McKinsey & Company, the years since the end of the last war have been marked by three major developments or three major fields of interest in so far as management technique in American business is concerned. These areas have dominated the thinking and the planning and the worrying of a lot of business executives. They have been covered exhaustively in our business literature. They have topped the list of subject matter

for conferences of the American Management Association and similar organizations. In addition there probably isn't a single organization represented in this room today that hasn't been actively involved in at least one of these three areas. Here is what they are: First, decentralization of operations or decentralization of management as it is sometimes called; second, management development programs; and third, incentive compensation plans for executive personnel. Decentralization, management development, incentive compensation.

As you can readily see, there is a high degree of relationship among these three activities, at least in so far as their underlying objectives are concerned. Yet at the same time, each is quite obviously a separate and distinct technique. Let's take just a moment to look into and review briefly the significance of each one of these movements.

### Decentralization

Of these three developments, probably the most widespread one has been decentralization of operations, by which, of course, we mean the breaking down of large functionally organized companies into small units, each of which is relatively self-contained and held accountable for over-all results. Usually these over-all results are expressed in the form of operating profits.

Essentially, the basic objective behind this whole decentralization movement has been to broaden a company's profit responsibility base by replacing functional specialization with over-all accountability. Consciously or unconsciously, top managements have been striving, through decentralization, to replace a whole generation of administrators with a new generation of businessmen. That is, they have been striving to recreate the conditions under which down-the-line management can develop real hard-headed profit-making competitive instincts.

\* Presented at the National Conference, Hotel Penn-Sherwood, Philadelphia, Pennsylvania, May 20-21, 1954. Mr. Neuschel is a principal of the firm McKinsey & Company, management consultants.

### Executive Development

Hand in hand with decentralization goes the great amount of interest that has been shown in recent years in formal executive development programs. One of the purposes of decentralization, of course, is the development of more top management or top executive talent; that is, to create the conditions under which our business community produces fewer functional specialists and more specialists in the general problems of management. But most companies haven't relied on decentralization alone to do this job. Whether they are organized on a functional basis or on a profit accountability basis, a great many companies have set up a formal, programmed approach to executive development.

In different companies the method of attacking this whole problem has been approached somewhat differently. For example, some companies have concentrated on the mechanics or the gadgetry of executive development by preparing such things as manning specifications and appraisals, job rotation and promotion schedules, replacement tables, and the like. Other companies have approached the problem somewhat differently by trying to create the conditions that encourage and help men to develop themselves. There are a great many ways in which this can be done and it is not our specific purpose to consider them here. Essentially they add up to building the opportunity and the challenge for self-development into the total environment within which men carry on their day-to-day work.

But regardless of the different approaches that might be taken to this whole problem of executive development, they all seem to reflect a growing conviction on the part of many managements that executive development can no longer be left to chance. It is something that we find forward-looking managements approaching consciously and systematically instead of continuing to let it be the product of accident and default.

### Incentive Compensation

The third marked movement in management technique, as I said a moment ago, is the fairly widespread adoption of various kinds of incentive compensation plans for executive personnel. There are at least two reasons why this field has gotten such a big play in recent years. The first and most obvious one, of course, is that two of the basic economic facts of life—inflation and higher income tax rates—have put the executive group at the very bottom of the heap in our economy so far as improvement in real income is concerned.

Another reason is a growing desire to increase the motivation of executives by relating their compensation directly to the results they produce, or directly to their performance. That is, regardless of how much an executive may be paid or whether over the years there has been an increase or a decline in his real income, a lot of

managements feel today that a substantial part of his compensation ought to be related as directly as possible to his contribution to company profits, both long-term and short-term.

### Basic Requisite

So much, briefly, for these three major post-war developments in management technique, decentralization, formal management development, incentive compensation. Now let me try, if I can, to relate this bit of background to the broad field of interest that this group represents as well as to the specific subject mentioned in your program. It seems to me that the tie-in lies in the fact that there is one common thread woven through all three of these management movements or, stated in another way, there is a single basic requisite underlying all three of them. For any one of these techniques to be fully successful, the development and application of *objective methods for measuring executive performance*, is required.

Take decentralization again as an example. Probably one of the greatest strengths of decentralization is that it automatically enlarges the use of the best performance measurement device that has ever been developed, and that is profits. But, of course, as we all know, the need doesn't stop there. As a matter of fact, probably the biggest single job that decentralization has dumped into the laps of top management is the need for developing a whole host of new goals and standards and measurement techniques where none have ever been successfully applied before. You see, decentralization is all right if it works, but if it is really going to represent delegation instead of abnegation, then "running the whole show" by oneself has to be replaced with a great deal of skill in evaluating how someone else is running it.

Again, take the field of management development. Performance measurement techniques play an important part here, too. For example, one of the key steps in a lot of formalized management development programs is to study the profit-making components of each job in order to help show every executive exactly what is expected of him, and in that way to help tie his performance directly into the objectives of the business as a whole. We find that whenever this is skillfully done a tremendous training potential is created through the review of the performance strengths and weaknesses of every executive in the light of his own particular profit responsibilities.

Finally, take once more the field of executive incentive compensation. Here performance measurement is one of the very keystones to successful administration of the plan. As you may know, a lot of plans in this area have failed pretty badly in the sense that they have produced only higher executive costs without increasing executive effectiveness or output to any marked extent. The real underlying reason is that the incentive value of the plan has been lost because the bonus tends



to become almost automatic; that is, some across-the-board percentage of every person's or every participant's salary.

In other instances we see the bonus being used to bolster the salary of underpaid jobs or withheld because the salary is already too high.

In contrast to these fairly common abuses, the real need in this whole area is to develop some means of making certain that the incentive payment received by every executive is related directly to his own performance. That means simply that we have got to develop a higher degree of skill in evaluating performance on the executive jobs that are subject to the compensation plan.

### **Performance Measurement**

As I said before, performance measurement is a common thread woven through all three of these management movements. Actually when you stop and think about it, it is really a great deal more than just a common thread. It is really a keystone in every one of these areas. In our experience, the companies that have gotten the most out of decentralization, executive development, incentive compensation plans, and the like, are those companies that have done the most far-reaching and imaginative job of developing performance measurement techniques where none has ever been applied before. A few companies have done some pioneering work in this field already and a lot more, in our experience, are just getting under way with the development of integrated measurement programs of their own.

A great deal, of course, still remains to be done in this whole area. We feel that the field is one which is going to show a great deal of activity in the years ahead and which should produce some fairly far-reaching advances both in executive motivation and executive control.

In view of this possibility, I would like to take a quick look with you at just what the measurement of executive performance means, what some of the problems are that lie in this area, what part budgeting plays in this whole process, and how you might approach setting up a formalized measurement program in your own company.

As a beginning point, I would like to try to draw a distinction among three different types of executive jobs to which performance measurement has to be applied. First, there are those jobs that have full profit responsibility. These, of course, are the general management jobs as distinct from the functional management jobs. They include such positions as the president, executive vice-president, general manager, or the manager of a relatively self-contained product- or geographic-division of the company. Second are those jobs that don't have full profit responsibility but on which the primary elements of short-term performance can be expressed quantitatively and in terms of contribution to company

profits. In any "make and sell" business, the two jobs comprising this category are those of the chief sales executive and the chief manufacturing executive. The third and final group consists of those jobs which do not have full profit responsibility and on which none of the important elements of performance can be expressed in terms of contribution to profits.

Here, as we see it, are some of the problems of measuring executive performance for each of the three types of executive jobs that I have just mentioned.

### **Full Project Responsibility**

First, on jobs with full profit responsibility, the task of measurement at first blush seems quite simple. That is, as we all know, the job of measurement is facilitated here by the fact that the primary index of short-term performance can be expressed quantitatively. That index, of course, is profitability, which is usually expressed in terms of return on capital investment. Even on this type of job, we have a real question as to whether performance against the current year's profit goal is enough of a measurement and, specifically, whether it is an adequate measurement by itself, of contribution to long-range profits. We suspect strongly that it is not.

In a great many situations we have seen that where undue emphasis is placed on the achievement of short-term profit goals, a company can slip into a bad labor relations situation, let its plant or product line become obsolete, or develop bad customer or public relations. A more subtle and yet equally far-reaching danger is that the company may fail over the years to attract and hold competent people and to develop them effectively. Hence we feel that the total performance of a general management executive involves the achievement of a good sound balance between long-term and short-term profit factors. The evaluation of a general management executive ought, therefore, to be extended to include, such performance factors, for example, as: (1) long-term technological leadership in products; (2) employee attitudes; and (3) long-term development of competent managerial and specialist personnel, ("specialist" includes professional and technical people.)

### **Contribution to Profits**

Let us look now at some of the problems of measuring performance on those jobs that do not have full profit responsibility but on which short-term performance can be expressed in terms of contribution to company profits. As I said earlier, these jobs include those of the chief line sales and production executives, either in the company as a whole or in one of its self-contained product or geographic divisions. First, to measure contribution to profits in this area requires the existence of certain cost accounting techniques that enable us to isolate and measure the effect on profit of such factors as (1) fluctuations in sales volume



that are the responsibility of the sales department, (2) fluctuations in volume that are the responsibility of the production department, (3) manufacturing cost variances, and (4) selling price variances.

Realistically, again, even on these two jobs an important part of measurement has to do with elements of performance whose effect on profits can't be measured directly. As a matter of fact, a good many of them can't even be expressed in quantitative terms and their full effect can usually be felt only over a long period of time. For example, in the manufacturing area this particular group of performance elements includes such factors as product quality, performance in meeting delivery schedules, long-term trend in labor productivity, long-term trend in material usage performance, and so on. In the marketing area somewhat comparable factors might include such things as trend in market penetration, the gain or loss of customers or accounts, and so forth.

#### **Non-Measurable Elements**

Finally, we have that category of executive jobs which also does not have full profit responsibility and on which none of the important elements of performance can be expressed in terms of contribution to profits. This category, unfortunately, includes all of the other executive jobs in the book. It includes such positions as that of chief engineer, controller, industrial relations director, director of purchasing, and so on. Here, the evaluation of executive performance becomes the most difficult; this is the area in which relatively little has been done by way of developing reasoned performance measurement techniques.

I think this situation is brought out by the fact that the only performance goal that is typically set up for these positions to achieve is an annual expense budget, which we must all admit measures much the least important of the performance elements in these jobs. In terms of contribution to long-run profits and long-term competitive strength, we all know that it is the results achieved in these jobs and not the operating cost of running them that really pays off.

#### **A Supplement to Budgeting**

These, then, as we see them, are some of the problems that American business faces in this whole area of measuring executive performance.

What part does budgeting play in this whole process? How many of these problems are solved by the budgeting technique with which this group is primarily interested? I think the answer is fairly obvious. That is, budgeting is the primary planning and measurement device in use in American business today for setting up and achieving short-term profit goals. As such, it has played a major role in the development of such other concepts and techniques as integration of operations, profit planning, and the like. But at the same time we must recognize that budgets don't do, and aren't intended to do, the whole per-

formance measurement job. As we have seen, there are at least two areas where other techniques are needed to round out the performance measurement picture. These areas involve, first, those important elements of performance that can't be expressed quantitatively or in terms of contribution to profits; and secondly, those elements of performance that, by and large, determine the long-range profit result of the company.

It is unhappily true, I am afraid, that those elements of performance which are most difficult to measure are the ones that have the greatest bearing on the long-run success of the company. Hence one of the greatest needs in developing an integrated or comprehensive program of executive performance measurement is to make very sure that it represents a proper balance between measurement of long-term and short-term factors.

In face of all of the grave difficulties that lie in this whole area, how can anyone go about the job of trying to improve performance measurement techniques among the executive group in his company? Unfortunately, as I have already implied, there isn't any complete answer. Within the span of our knowledge and experience no company has yet done a finished job in this area, although, as I said, some are hard at work trying to do so. In the absence of a finished answer, however, I would like to try to give you something of a starter—perhaps a suggested approach that might stimulate your further thinking in this area and point the way to how you might approach the job in your own companies.

First, let me emphasize that the approach I want to suggest very briefly leaves unanswered almost as many questions as it provokes. It is certainly not a finished job but at the same time it represents a beginning that we have seen stimulate some really creative thinking and doing in a number of situations.

#### **End-Result Goals**

Essentially, what we want to talk about here is the need for supplementing the budgeting process by finding ways of evaluating the *intangible* elements of performance in the three types of executive jobs that we have been considering, that is, those elements which have only an indirect and very often only a long-range effect on profits. The key step in measuring these intangibles is to establish a set of goals specifying what each incumbent ought to accomplish—the specific things that he is responsible for achieving. As we see it, these goals ought to be expressed in terms of the end results to be achieved and not in terms of innate personal qualities, skill in the use of managerial techniques, or the presence of all of the right management tools in that particular area, such as policies, organization charts, written procedures, and the like.

This distinction between end results to be achieved on the one hand and innate personal qualities or adherence to accepted management practice is an important and a fundamental one. The reason is that even where all the proper per-

sonal qualities exist in full measure, even where all of the right rules of the game are being followed and all the most modern management techniques are being used, the executive may still not be achieving the desired end result. For example, witness the case of a large company I know of in which everybody in the whole organization is literally spending so much time being nice to everybody else, and so much time in conferences clearing everything with everybody else, that virtually nothing ever gets done. This company is just loaded with able, fine, competent people and they are using all of the accepted modern management techniques out of the book in full measure, and yet steadily, over the past several years, the company has been declining in its industry position.

Thus, one of the key steps in the effort to measure these important intangible factors is to base the measurements on demonstrated performance and not on promise or potential or attributes.

#### **An Example**

Let me just give a few "for instances" to illustrate the sort of criteria that typically might be used in evaluating a management job in a given situation. Take the director of purchases as an illustration. Some of the factors that might typically be used in evaluating the performance of that job include: direct operating expense, the consequential costs or benefits obtained, and delivery performance. There are probably other factors but these three are among the most important.

Now under each of these three main headings here are some of the subfactors that might be weighed in a given situation. Under direct operating expense we would have: first, how does actual departmental expense compare with the budget? and secondly, is this budget based on up-to-date engineered standards? That is, is it based upon a thorough-going, comprehensive procedure and work measurement analysis conducted within the past five years?

Under consequential costs and benefits we would consider: first, price results—on key items purchased, have the prices paid been consistently at the market, above the market or below the market? secondly, research results—what improved or lower-cost substitute materials have been developed through the research of the purchasing department? What other savings have been achieved through research into different purchase quantities, different types of suppliers, different packaging methods, different inbound transportation or delivery methods, and the like?

Under delivery performance we would weigh such factors as the extent to which promise dates have been obtained, the extent to which they have been lived up to, and what are the consequences of delivery failures.

These particular performance elements, as I said, are only illustrative. In any given situation, the criteria actually used ought to be related to

the particular needs of that company after an exhaustive study had been made of the profit potential in individual jobs.

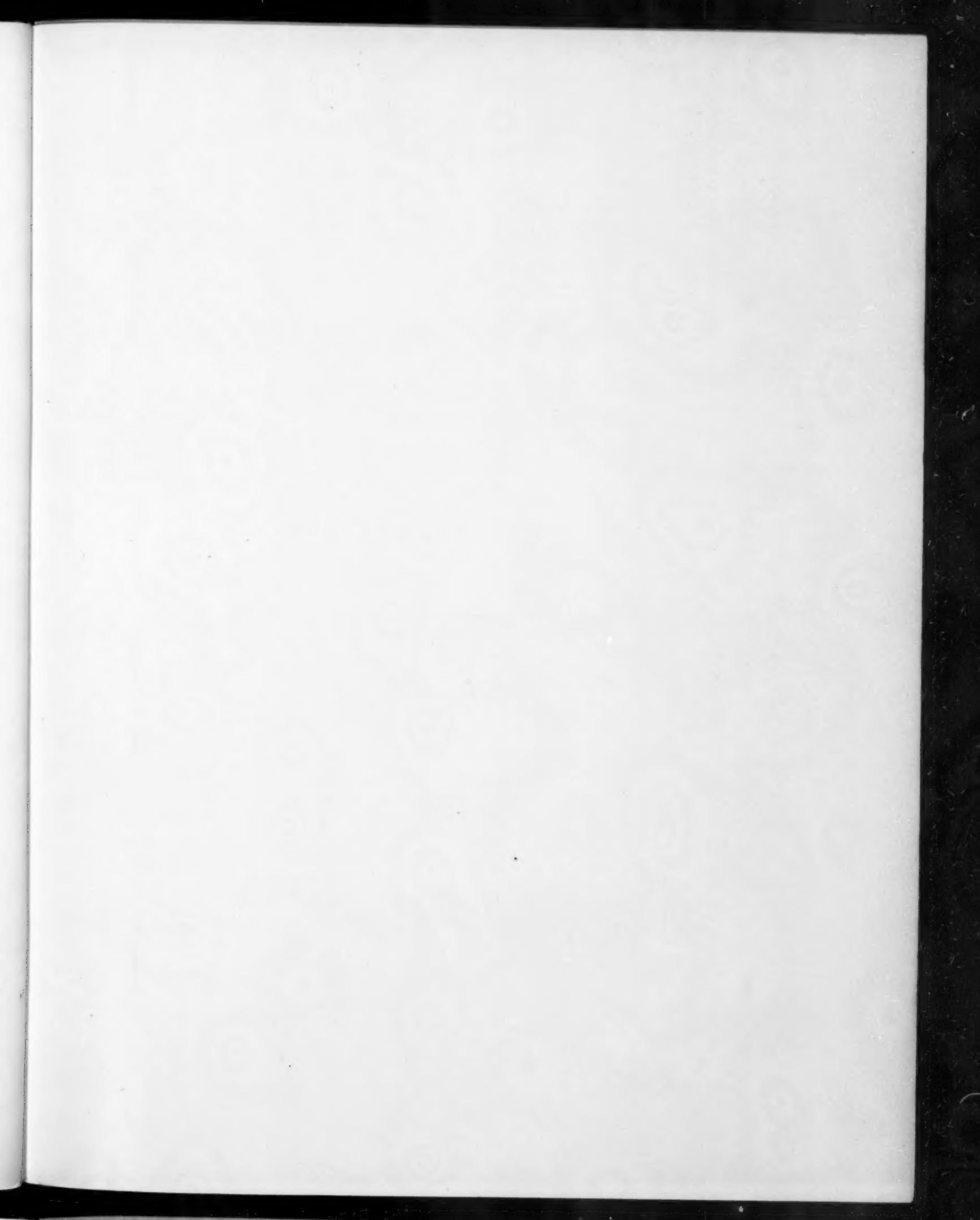
#### **Quantitative Rating**

In concluding, let me give you very briefly just two other steps of this suggested approach. First, since all the elements involved in any given executive job won't be of the same importance, it is probably desirable to assign some sort of numeric weighting to them to indicate the relative impact of each one of these performance elements on the job's total profit-producing potential. Second, of course, judgment must periodically be applied to the incumbent's actual performance in order to rate his performance on each one of the prescribed elements.

In addition, under an executive incentive compensation plan, it would be desirable to assign a numeric rating to the individual's performance on each element, say, on a scale from 1 to 10. In that way, it is possible—by multiplying the rating given to a man's performance by the numeric weighting assigned to that element—to come up with a single indicator or a common denominator that serves two purposes: (1) it indicates the over all performance or the net effect of all of the elements of performance on that particular job, and (2) it enables you realistically to relate each executive's performance to that of every other executive under the program.

These, gentlemen, are the essential features of the plan that I wanted to throw out for your consideration. It is, as I said, only an illustration of one approach. I don't mean to suggest in any way that the evaluation of these intangible factors is either easy or precise. It can't be nearly as exact as the use of numbers in rating would tend to indicate.

In spite of all of the difficulties involved in this area, something does need to be done if we are going to sharpen our skill in measuring executive performance. An important fact, I think, that we have come to recognize is that an evaluation of some sort is always going to be made, in any event. The real underlying question, therefore, is whether the judging that does take place is going to be done consciously or unconsciously, consistently or inconsistently, and with or without an adequate basis. Finally, we feel that it is highly desirable that whatever evaluation is made be based on a common understanding among everyone concerned as to exactly what factors are going to be rated and what the relative importance of each one of them is. This, in our experience, is the problem of developing effective techniques for measuring the performance of the executive group in our American business community. We think that some important strides forward are going to be made in this whole area in the next several years, and to the extent that that is so, it will comprise, we think, a very much worthwhile supplement to the highly refined budgeting techniques with which you gentlemen are primarily concerned.





2



